

2.0 Alternatives

A Scoping process was used to identify the range of alternatives to be addressed in the Draft Environmental Impact Statement (EIS), consistent with federal (23 CFR 771.123(b) and 40 CFR 1501.7) and state (Minnesota Rules, part 4410.2100) requirements. Section 8.1.1 of this Draft EIS describes the Scoping process and related public involvement in more detail. The process for alternatives development, analysis, and decision-making consisted of four sequential steps:

- **2011-2012 Scoping Process:** During this process a range of alternatives were studied at a Scoping-level of design development to identify alternatives recommended to be carried forward for more detailed study in the Draft EIS. This process is documented in the February 2012 Scoping Document (SD)/Draft Scoping Decision Document (SDD) and the September 2012 Final SDD, available on the project website.¹
- **2013 Amended Scoping Process:** An initial assessment of Draft EIS alternatives was conducted, leading to re-Scoping of alternatives considered previously and ultimately resulting in one additional alternative being recommended for study in the Draft EIS. This process is documented in the September 2013 Amended SDD, available on the project website.²
- **Draft EIS Alternatives Refinement:** A more detailed refinement of the Draft EIS alternatives and construction options took place in order to define them prior to assessment of social, economic, and environmental impacts; costs; engineering feasibility; and other issues.
- **Preferred Alternative Identification:** The Draft EIS alternatives were evaluated based on the assessment of impacts, costs, feasibility, and other issues to identify a preferred alternative.

Throughout the process, the Minnesota Department of Transportation (MnDOT) coordinated with regulatory agencies, local governments, businesses, and other stakeholders to get input for consideration in developing and evaluating alternatives. The sections that follow summarize the steps in the alternatives development process.

2.1 2011-2012 Scoping

2.1.1 Initial Development of Alternatives

A range of project alternatives was developed based on several data sources and stakeholder feedback, including the project Purpose and Need (see Chapter 1: Purpose and Need), previous MnDOT and United Taconite (UTAC) design concepts, and consideration of applicable technical data. During the initial part of the Scoping process, the MnDOT team and stakeholders identified broad corridors for Build Alternatives: West, Middle, and East. The primary differentiating features of the corridors include the following:

- West Corridor routes avoid ferrous resource conflicts by going around the Biwabik Iron Formation and using existing travel corridors such as highways or railroads
- Middle Corridor routes provide the most direct connection of US 53 while complying with the requirement to evacuate the existing easement agreement area
- East Corridor routes allow for maintenance of existing access between Virginia, Gilbert, and Eveleth

These corridors are shown in **Figure 2.1-1**.

¹ <http://www.dot.state.mn.us/d1/projects/hwy53relocation/scoping.html>

² <http://www.dot.state.mn.us/d1/projects/hwy53relocation/scoping.html>

Within each of these broad corridors, specific alignments were developed based on available information on physical, social, and environmental factors identified in data collection and through coordination with project stakeholders. Four alignments were identified within the West Corridor, two within the Middle Corridor, and four within the East Corridor. These Build Alternative alignments are shown in **Figure 2.1-2** and are described in detail in Section 2.1.3. In addition to the Build Alternatives, a No Build Alternative and an alternative that would keep US 53 on its existing alignment, requiring direct acquisition of the existing easement agreement area (Existing US 53 Alternative), were also defined. These alternatives are also described in Section 2.1.3.

2.1.2 Agency and Stakeholder Involvement During Scoping

As part of the Scoping process, a Project Advisory Committee (PAC) consisting of local community representatives was regularly consulted and informed of project progress; a public meeting was held on March 22, 2011; and input from cooperating agencies (US Environmental Protection Agency (USEPA) and US Army Corps of Engineers (USACE)) and other project stakeholders was incorporated into the alternatives development, analysis, and decision-making. In February 2012, a SD/Draft SDD was released for a 30-day public comment period (which included a public hearing) to provide information on the Scoping process and preliminary Scoping decisions and to provide an opportunity for formal public and agency comment. Those comments were considered in the preparation of the Final SDD, released in September 2012. Section 7 of the SD/Draft SDD and Section 9 of the Final SDD³ provide additional details of the public and agency involvement during Scoping.

2.1.3 Scoping Alternatives Development, Evaluation, and Decision-Making

The February 2012 SD/Draft SDD and September 2012 Final SDD documents⁴ describe the process of developing and evaluating the Scoping alternatives in detail. The evaluation process included consideration of issues such as how well each alternative met the Purpose and Need; potential for social, economic, and/or environmental impacts; relative estimated costs; and potential engineering feasibility issues. As described in the previous section, stakeholder input was also factored into the evaluation process. The range of alternatives evaluated during Scoping and the Scoping decisions (which alternatives would be carried forward for further study in the Draft EIS and which would not be) are summarized below.

2.1.3.1 2012 Alternatives to be Carried Forward for Study in the Draft EIS

■ No Build Alternative

The No Build Alternative would respond to the easement terms by closing the segment of US 53 through the existing easement agreement area, resulting in traffic being rerouted to existing highways. Signage would be used to officially mark the rerouting of US 53, which would follow existing MN 37, County Road (Co.) 7, and US 169 (between Co. 7 and existing US 53) (see **Figure 2.1-3**). Signs and strategic highway safety improvements, such as striping, rumble strips, turn lanes, signal installation, or signal modifications, as needed, were initially included to address these roads and other connecting roads. No major improvements were proposed in this alternative that required substantial acquisition of new right-of-way.

This alternative does not meet the project's Purpose and Need. However, it served as the baseline for comparison of alternatives and is required under NEPA to be evaluated in the EIS for comparison purposes.

■ Existing US 53 Alternative

The Existing US 53 Alternative, though not in compliance with the terms of the existing easement agreement, was proposed to keep US 53 in place and open to traffic by addressing the economic, legal,

³ Available at <http://www.dot.state.mn.us/d1/projects/hwy53relocation/scoping.html>

⁴ Available at <http://www.dot.state.mn.us/d1/projects/hwy53relocation/scoping.html>

and engineering issues associated with resolving the terms of the existing easement agreement. The State of Minnesota would not vacate US 53 but would keep the highway open (see [Figure 2.1-4](#)).

Keeping the highway open in its current location would require the State of Minnesota to acquire the property by direct purchase and most likely the use of eminent domain. If the eminent domain action were successful, the cost of the land could equal or exceed the cost of the ferrous resource reserves initially estimated at values of \$400 million to \$600 million.⁵

While this alternative presents many risks, including the potential for high costs, it succeeds in avoiding and minimizing other social, economic, and environmental impacts through continued use of the existing US 53. This advantage warranted further consideration of the Existing US 53 Alternative in the Draft EIS.

■ **Alternative M-1**

This alternative would follow the grade created by the now backfilled Auburn Pit through the UTAC mine, providing the most direct route for a realigned US 53 (see [Figure 2.1-5](#)). Alternative M-1 would cross a mine operations area that will be active for many years, requiring mine vehicles and equipment to pass under the highway. Crossing over the Auburn Pit was expected to minimize long-term conflicts with remaining ferrous resource reserves and the potential need to relocate the highway to accommodate future mining activities.

Key factors in the determination to retain this alternative for study in the Draft EIS were that the direct route (the shortest of the new alignment options) may reduce impacts to business access and community cohesion, and routing over the Auburn Pit in the UTAC mine may reduce ferrous resource encumbrance and natural resource impacts. The corridor also provides a potential utility corridor to retain connections to the Midway area. While business impacts due to air quality compliance were a potential concern, this alternative warranted further evaluation in the Draft EIS.

■ **Alternative E-2**

As shown in [Figure 2.1-6](#), Alternative E-2 crosses the water-filled Rouchleau Pit at one of its narrow openings, while at the same time balancing concerns about getting back to the 2nd Avenue interchange by the shortest route in order to minimize community impacts. This alternative was also located strategically to be outside of the UTAC permit to mine area and environmental setting boundary on the northeast side of the pit. Because this alternative crosses over known ferrous and non-ferrous

A **permit to mine** means legal approval has been given by the commissioner of the Minnesota Department of Natural Resources to conduct a mining operation. The only permit to mine boundary (extent of permit limits) within the study area is issued to UTAC as the mine operator and is shown in [Figure 4.2-1](#). Obtaining a permit to mine for a new mine operation requires an environmental evaluation and mining plan.^A Any non-mining activity proposed within the permit to mine area would potentially be in conflict with mining operations and deemed a potential business impact to the mine operator and landowner.

The **environmental setting boundary** is beyond the permit to mine area and includes additional areas that may be directly or indirectly affected by mine activity. It is the boundary most closely aligned with the area leased by the mine operator.

Therefore, the term **"permit to mine"** is used when describing the area of mine operations, and the term **"environmental setting boundary"** is used when referring to the broader, legal limits of the UTAC mine.

^A http://dnr.state.mn.us/lands_minerals/mineland_reclamation/index.html

⁵ The initial estimate of \$400 million to \$600 million is based on the potential royalty value of the existing US 53 easement agreement area segment (the land and mineral values) plus the potential business volume (margin) that could be derived from mining, processing, and shipping ferrous resources. This range was calculated based on publicly available data about the mine, with input from UTAC and the Minnesota Department of Natural Resources Land and Minerals Division. The range is provided for the purpose of comparing alternatives and does not represent a negotiated value between the State of Minnesota and the mine's owners and operators. A large contingency is reflected in this range because of uncertainty in how the alternative would work both legally and physically.

metallic resources, an issue to be considered in the Draft EIS is the potential for future mining conflicts.

Alternative E-2 was retained for further consideration since it provides a direct route comparable to existing conditions with potential minor impacts to the business community and local traffic, while potentially allowing for the provision of utilities between Virginia's central business district and the Midway area. In addition, Alternative E-2 could avoid the UTAC environmental setting boundary, which could eliminate the business risk to UTAC regarding air quality compliance.

2.1.3.2 Alternatives Not Carried Forward for Study in the Draft EIS

■ West Corridor Alternatives (W-1, W-2, W-3, W-4)

All alternatives considered in the West Corridor made their northern connection to US 53 approximately at the 13th Street South traffic signal on the west side of Virginia. The southern connection to existing US 53 was made either by way of MN 37 (Alternatives W-1, W-2, and W-3) or Co. 101 (Alternative W-4). The West Corridor alternatives varied in length from 9.4 to 13.5 miles. Since other Build Alternatives (i.e., Alternatives M-1 and E-2) would meet all of the identified needs with less severe social, economic, and environmental impacts, none of the West Corridor alternatives (described in detail below) were proposed to be carried forward for study in the Draft EIS.

Alternative W-1

Alternative W-1 largely followed existing highways (MN 37 and Co. 7). These routes were both two-lane highways, which could provide a portion of the right-of-way needed for the Alternative W-1 corridor. The MN 37 existing right-of-way is an average of 150 feet, and the Co. 7 existing right-of-way ranges from 80 to 140 feet.

The findings of the Scoping assessment (2012 SDD) with respect to estimated construction costs, user costs, and Scoping level social, economic, and environmental impacts resulted in the decision to not carry this alternative forward for further consideration in the Draft EIS at that time since other Build Alternatives (i.e., Alternatives M-1 and E-2) would meet all of the identified project needs with less severe social, economic, and environmental impacts.

Alternative W-2

Alternative W-2 included a new corridor connection back to Co. 7, blending the features of highway- and railroad-based alignments. This alternative provided a shorter route than Alignment W-1 by diverting from MN 37 at the railroad corridor, running parallel to the railroad line, and connecting to Co. 7 north of Co. 101.

This alternative reduced the number of potential property relocations and the length of the highway corridor compared to Alternative W-1 by going on a new alignment parallel to existing railroad tracks. However, this alternative was not carried forward for further consideration because, while reducing overall length, the use of new alignment would result in greater construction costs and more acres of right-of-way acquisition.

Alternative W-3

Alternative W-3 paralleled existing railroad corridors and did not use the Co. 7 corridor, in effect creating a new highway corridor parallel to Co. 7 between MN 37 and US 169. This alternative reduced the number of potential property relocations, stream crossings, and the length of the highway corridor compared to Alternative W-1 by going on entirely new alignment parallel to existing railroad tracks.

However, this alternative was not carried forward for further consideration because, while reducing overall length, the use of new alignment would result in greater construction costs and more acres of right-of-way acquisition.

Alternative W-4 (Two Options – "A" and "B")

Unlike the other West Corridor alternatives, Alternative W-4 used existing Co. 101 from US 53 through the communities of Eveleth and Leonidas to connect to Co. 7 and turn north toward Virginia. By using Co.

101, more of the existing US 53 highway was retained. Additionally, this alternative recognized the natural route for motorists traveling from Gilbert to Virginia as using MN 37 from Gilbert to Eveleth and continuing on that alignment where MN 37 turns into Co. 101. Unlike the other western alternatives, Alternative W-4 did not avoid conflict with ferrous resource reserves.

Co. 101 through Eveleth is heavily developed, with dozens of residential and commercial properties directly adjacent to both sides of the roadway. Due to this urbanized character of the corridor in Eveleth, two options were considered for the Scoping review:

- **W-4A (two lanes through Eveleth):** This option tried to limit impacts to adjacent property owners by retaining the two-lane cross section of Co. 101 through Eveleth. At minimum, however, many of the access points in Eveleth would have needed to be closed or modified. All existing and other new segments of US 53 outside of Eveleth would have been four lanes.
- **W-4B (four lanes through Eveleth):** This option provided four lanes of traffic, consistent with the rest of US 53 in the project area. This would have required a widening of the Co. 101 corridor through Eveleth, resulting in the acquisition of residential and commercial properties and substantial changes to how the community is accessed.

Alternative W-4A was not carried forward for further consideration because it only partially meets the project Purpose and Need. In addition, it would not substantially decrease social, economic, and environmental impacts as it would have substantial direct impacts within Eveleth, so there was no reason to retain this alternative as an approach to avoid adverse impacts.

While Alternative W-4B utilized existing travel corridors for a connection between Virginia and Gilbert, the Midway area, or Eveleth, it was not carried forward for further consideration because the expansion of Co. 101 to a four-lane facility through Eveleth would cause substantial community impacts for right-of-way, property relocations, and business access. This route, like the other West Corridor alternatives, would have negative impacts to access in Virginia and would not provide the benefit of avoiding conflict with ferrous resources as would other West Corridor alternatives. Additionally, Co. 101 crosses the existing UTAC permit to mine area and environmental setting boundary, and the mine operator has indicated that it would likely close Co. 101 to through traffic at a future time (estimated by 2024) when it resumes mining in this area.

■ **Middle Corridor Alternative (M-2)**

Similar to Alternative M-1, Alternative M-2 followed the grade created by the now backfilled Auburn Pit through the UTAC mine. Alternative M-2, however, provided an option that would re-join existing US 53 closer to 2nd Avenue, which is an important connection to Virginia's central business district.

The primary benefit of Alternative M-2 compared to Alternative M-1 was that it ran closer to the existing 2nd Avenue access. In order to gain this relatively minor improvement in travel time to Virginia's central business district, the alignment would cross over known ferrous resource reserves.

Alternative M-2 was not carried forward for further consideration because the Alternative M-2 conflict with ferrous resource reserves greatly increased anticipated business impacts and related potential compensation and legal costs/risks, similar to the Existing US 53 Alternative. The value of the ferrous resource reserves in conflict could be less than the Existing US 53 Alternative; however, the compensation values could still rise to hundreds of millions of dollars. Furthermore, Alternative M-2 had many transportation performance and construction cost similarities to Alternative M-1 and did not avoid the potential for mine business risks. Therefore, the extra expense for the additional ferrous resource reserve conflict was not warranted.

■ **East Corridor Alternatives (E-1, E-3, E-4)**

Alternative E-1

Alternative E-1 was the closest of the East Corridor alternatives to the existing alignment. One advantage of this route was the potential for limited or no impacts to the existing 2nd Avenue interchange ramps.

This alternative would maintain that straight east-west route, cross the Rouchleau Pit at one of its widest locations, and then turn south near the existing Landfill Road in order to connect back to US 53.

The key benefit of this alternative was the retention of current US 53 functionality, including access at 2nd Avenue similar to the existing configuration. However, Alternative E-1 was not carried forward for further consideration in the 2012 Scoping process because, compared to other East Corridor alternatives, this benefit was outweighed by the potential for mine air quality compliance concerns (compared to other East Corridor alternatives), higher right-of-way costs due to conflicts with the existing UTAC permit to mine area and environmental setting boundary, and potential construction costs due to crossing the widest portion of the Rouchleau Pit.

Alternative E-3

Alternative E-3 was similar to Alternative E-2; the primary difference was that Alternative E-3 provided a longer route to make the curve from the Midway area back into Virginia. This route still crossed the Rouchleau Pit at a narrow crossing location but had the effect of lengthening the corridor northward into more privately-owned lands before turning back to the existing US 53 alignment at 2nd Avenue. The only known advantage of Alternative E-3 versus Alternative E-2 was greater distance from the UTAC environmental setting boundary, perhaps reducing the potential for proximity conflicts.

This alternative was not carried forward for further consideration because it offered relatively few benefits compared to Alternative E-2. Other features of this route would generally require more construction costs or more complex right-of-way acquisition due to greater conflicts with privately owned lands and minerals.

Alternative E-4

This was the only East Corridor alternative that did not reuse the existing 2nd Avenue interchange. Instead of connecting back to US 53 at 2nd Avenue, this alternative was routed to the north side of Virginia, where it used the 9th Street North corridor. The Rouchleau Pit crossing was wider than in Alternatives E-2 and E-3. Additionally, the route ran near the existing water intake for Virginia's water supply, which comes from the Rouchleau Pit. This corridor also ran directly by Essentia Health-Virginia. For consistency of comparing alternatives, a 300-foot wide corridor centered on 9th Street North was used for this Scoping analysis; 9th Street North is an existing four-lane undivided roadway with multiple private access points provided.

Alternative E-4 was not carried forward for further consideration for reasons that include the impacts to business access and community cohesion, as well as high construction costs. Potential direct impacts to Virginia's water supply were also a concern.

2.2 2013 Amended Scoping Process

After the SDD was distributed in September 2012, more detailed study of the Draft EIS alternatives and their potential impacts was performed. The initial findings regarding the cost and feasibility of some of the Build Alternatives led MnDOT to 1) reconsider some Scoping alternative alignments (i.e., Alternatives W-1 and E-1) that had been dismissed from further consideration in the Draft EIS during the 2012 Scoping process and 2) assess whether minor alignment modifications to some alternatives (i.e., Alternative E-2) would make them more feasible/cost-effective. In order to add or amend alternatives to be studied in the Draft EIS, an Amended Scoping Decision Document had to be prepared (Minnesota Rules, part 4410.2100, subpart 8). The September 2013 Amended Scoping Decision Document (ASDD)⁶ and the Alternatives Development Report (Kimley-Horn, 2014; provided in [Appendix K](#)) provide details of the Scoping reassessment and the resulting decisions regarding alternatives that would be carried forward for study in the Draft EIS. The amended Scoping process alternatives and the amended Scoping decisions regarding alternatives to be carried forward for study in the Draft EIS are summarized in Section 2.2.2.

⁶ Available at <http://www.dot.state.mn.us/d1/projects/hwy53relocation/scoping.html>

2.2.1 Agency and Stakeholder Involvement During 2013 Amended Scoping

A public information meeting was held on April 22, 2013, at the Mountain Iron Community Center. The focus of this meeting was to provide information on the need for additional alternatives to be evaluated, review the revised schedule and study process, and collect comments and feedback from the public. Comments received at the meeting were similar to those previously provided (summarized in the ASDD), with a strong focus on reasons why the western alternative should remain dropped from further consideration.

On August 15, 2013, there was a conference call with the cooperating agencies to provide an update regarding the alternatives being evaluated and solicit input on issues to be considered in the amended Scoping process decision-making. Both the USEPA and USACE stated that they would not request that Alternative W-1A (see description in Section 2.2.2.1) be carried forward for further analysis in the Draft EIS.

An economic study was initiated specifically to evaluate the potential impacts to businesses and residents of the Quad Cities from closure of the US 53 existing easement agreement area segment or rerouting traffic to the west (No Build and W-1A Alternatives) as compared to other Build Alternatives (M-1, E-1A, E-2). The study was completed in January 2014 and is available on the project website.⁷ A number of public meetings were held specific to the economic study to inform the public of the scope of the study and to obtain input on perceived impacts.

As new alternatives were developed and evaluated, other agency and stakeholder coordination (with UTAC, Minnesota Department of Natural Resources (DNR), Minnesota Pollution Control Agency (MPCA), school districts, and cities) was also initiated to identify opportunities and impacts.

2.2.2 Alternatives Considered in 2013 Amended Scoping

2.2.2.1 Alternatives Added or Modified for Study in the Draft EIS

■ No Build Alternative

During the amended Scoping process, the No Build Alternative was revised so that it no longer included the minor improvements described in Section 2.1.3.1, such as turn lanes, striping, and signal modifications. This revised No Build Alternative reflects a true No Build Alternative in which minimal investments are made. As noted in Chapter 1: Purpose and Need, this alternative does not meet the stated needs of the project.

■ Alternative E-1A

Alternative E-1A is the closest of the East Corridor alternatives to the existing US 53 alignment (see [Figure 2.2-1](#)). The corridor makes its northern connection in vicinity of the 2nd Avenue interchange and maintains a direct connection to the southern reach of US 53 over the Rouchleau Pit. This alternative is a modified version of Alternative E-1, which was initially not retained for consideration in the Draft EIS because Alternative E-2 was thought at the time to provide a more feasible eastern alignment. The modifications to Alternative E-1 included shifting the alignment further to the west over the Rouchleau Pit, resulting in a shallower crossing of the pit along an existing submerged haul road embankment, which may result in fewer ferrous resource impacts. The E-1A alignment was also shifted further to the southeast between Cuyuna Drive and MN 135 to accommodate potential mine operational space needs.

Alternative E-1 was initially not carried forward in the SDD because of the uncertainty of compliance with mine air quality requirements (compared to other East Corridor alternatives), potentially higher right-of-way costs due to conflicts with the existing UTAC permit to mine area and environmental setting boundary, and construction costs due to crossing the widest portion of the Rouchleau Pit. With the modifications to this alternative, a feasible crossing would be achievable. Alternative E-1A would allow

⁷ <http://www.dot.state.mn.us/d1/projects/hwy53relocation/TechnicalReports.html>

development of options to cross the Rouchleau Pit with or without a bridge; crossing the pit without a bridge may involve partial dewatering of the pit during construction. This alternative remains within the environmental setting boundary; however, UTAC has completed a business risk assessment analysis that indicated low risk regarding the ability to meet its permit requirements with this alternative. Further details are provided in Sections 2.3.4 and 4.2.3.3.

2.2.2.2 Alternatives Not Carried Forward for Study in the Draft EIS

■ Alternative W-1A

Alternative W-1A was developed as part of the re-Scoping process in 2013. This included reassessment of the extent of potential social, economic, and environmental impacts versus the potential benefits of this alternative in avoiding impacts to the Biwabik Iron Formation. One change to Alternative W-1 from the initial SD/SDD was the addition of a direct connection from Co. 7 to US 53. The connection would include intersection improvements at 13th Street South, 17th Street South, and Unity Drive. This alternative would also include extensive intersection improvements at Co. 7/Co. 101, MN 37/Co. 7, and MN 37/existing US 53. These intersection improvements were added to provide better traffic flow for travelers by making US 53 a continuous through-route to better address the identified transportation needs.

Alternative W-1A would make its northern connection to US 53 approximately at the 13th Street South traffic signal on the west side of Virginia. The southern connection to existing US 53 is made by way of MN 37. This alternative is approximately 13.5 miles in length and largely follows existing highways (MN 37 and Co. 7).

As documented in the 2013 ASDD, Alternative W-1A would result in increased travel distances between the cities of Eveleth, Gilbert, and Virginia, adversely affecting businesses, residents, emergency response times, and school district operations. This alternative would also result in large impacts to wetlands and water resources and would have a substantial user cost increase compared to existing conditions. This alternative was not carried forward for further consideration in the Draft EIS since other Build Alternatives (i.e., M-1, E-1A, and E-2) would meet all of the identified project needs with less severe social, economic, and environmental impacts.

■ Alternative E-2A

Alternative E-2A is a sub-alternative of Alternative E-2 that was evaluated in addition to Alternative E-2. A section of Alternative E-2 north of MN 135 was shifted further to the east in an attempt to completely avoid any encumbrance of ferrous resources and/or mining exploration (non-ferrous metallic resource leases) at the edge of the permit to mine boundary, Biwabik Iron Formation, and mineral rich stockpiles along Landfill Road. The shift was made largely to avoid valuable stockpiles and the tailings basin east of Landfill Road that may have recoverable ferrous resources.

Alternative E-2A would maintain many of the benefits of Alternative E-2, including complete avoidance of the UTAC permit to mine boundary, minimizing the business risk to UTAC regarding future air quality compliance. However, moving the alignment further to the southeast would encroach upon the Iron Range Off-Highway Vehicle Recreation Area (OHVRA) to a greater extent than Alternative E-2, isolating a large portion of the recreation area that would be difficult to mitigate. To address DNR concerns with this alternative, additional study was conducted to determine if this shift would provide the benefit intended. Drilling was conducted to determine if ferrous resources are present near Landfill Road. Borings located 200 to 400 feet west of Landfill Road showed essentially no ferrous resources, indicating that the edge of the formation lies further west of these test sites. With that knowledge, Alternative E-2A was not proposed to be carried forward for further study in the Draft EIS since it was anticipated to result in substantial impacts to the OHVRA while providing no identifiable benefits over Alternative E-2.

2.3 Draft EIS Alternatives

As the Draft EIS analysis continued, design details were refined as new information was obtained and decisions were made regarding construction options. These design assumptions and decisions are documented in the Alternatives Development Report (Kimley-Horn, 2014; provided in [Appendix K](#)).

Agencies and key stakeholders continued to be engaged during the preparation of the Draft EIS in the development of information for the evaluation of impacts and mitigation.

This section provides a more detailed description of each alternative evaluated in this Draft EIS. All alternatives that have been carried forward for further study are shown on [Figure 2.3-1](#).

Each alternative has a defined area of evaluation based on general design assumptions, estimated construction limits, potential additional right-of-way needed for stormwater management and other related transportation functions, and other design factors. Staging areas, if required outside of the areas of evaluation, will be identified for the preferred alternative and evaluated in the Final EIS. These areas of evaluation were used to evaluate physical impacts in areas where ground disturbance is likely to occur under one or more construction option. Impacts related to aspects of the project other than ground disturbance (e.g., noise, economic, and community impacts) that may extend beyond the areas of evaluation were also evaluated and are discussed in the following chapters. Refinement in design and social, environmental, and economic impact analysis will occur for the preferred alternative prior to the issuance of the Final EIS.

2.3.1 No Build Alternative (Easement Agreement Area Closed)



The No Build Alternative would respond to the easement terms by closing the segment of US 53 within the existing easement agreement area, resulting in traffic being rerouted to existing highways. Signage would be used to officially mark the rerouting of US 53, which would follow existing MN 37, Co. 7, and US 169 (see [Figure 2.1-3](#)). No transportation systems management (TSM) elements (i.e., maintenance or operation improvements) are included in this alternative in order to represent a true No Build Alternative and because TSM improvements on the existing roadways would not provide the needed traffic capacity given the closure of the existing easement agreement area.

The following existing roadways would be designated as the official reroute of US 53 in their current condition:

- The south interchange of MN 37 and existing US 53 would remain in place, marking the location where northbound traffic would depart from existing US 53 to the newly signed route (existing MN 37)
- The four-mile segment of existing MN 37 to be used as US 53 is a two-lane highway with left and right turn lanes located at the intersection with Co. 7. Existing at-grade railroad crossings in this corridor would remain at-grade.
- Northbound US 53 traffic would make a right turn from MN 37 to Co. 7, a two-lane highway, traveling 8.75 miles before making a right turn at the signalized intersection with US 169. Existing at-grade railroad crossings in this corridor would remain at-grade.
- Less than a half-mile segment (0.4 miles) of four-lane US 169 would be used to the east to make the connection back to existing US 53 at the US 169 interchange

MN 135 is currently routed from Gilbert through the existing easement agreement area and into Virginia. The designation for MN 135 would be rerouted to the south using the existing US 53 alignment (starting at the existing US 53 northbound ramp to MN 135) to the south MN 37 interchange where it would follow the new US 53 route west along MN 37 ([Figure 2.1-3](#)).

US 53 within Virginia, between the US 169 interchange and the 2nd Avenue interchange, would be turned back to local government jurisdiction.

This alternative does not meet project Need #3 (connectivity/travel times) or #4 (capacity/mobility) described in Section 1.3.3 and 1.3.4, respectively. To meet Need #2 (constitutional route connectivity) as described in Section 1.3.2, signing and road designation changes would be needed to maintain the road connection from Eveleth to Virginia. However, it is an important baseline for the comparison of alternatives and is required to be evaluated in the Draft EIS for comparison purposes under NEPA and the Minnesota Environmental Review program.

■ Area of Evaluation

Under the No Build Alternative, no construction would occur, and traffic would be rerouted to other roads. Therefore, the area evaluated includes the existing right-of-way of those reroute roads.

2.3.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)



The Existing US 53 Alternative, though not in compliance with the terms of the existing easement agreement, would keep US 53 in place and open to traffic by addressing the economic, legal, and engineering issues associated with resolving the terms of the existing easement agreement. The State of Minnesota would not vacate US 53 but would keep the highway open (Figure 2.1-4).

Keeping the highway open in its current location would require condemnation by the State of Minnesota to oppose termination of the existing easement agreement knowing that the owner and lessee are not willing sellers. Even with the use of eminent domain, this alternative may require a large payment from the State to the owners and operators of the minerals and mining/lease rights (RGGS and UTAC).

Under this alternative, no roadway modifications would be made. While it was noted in the SDD (September 2012) that this alternative may include construction of a grade separation and other highway modifications to allow for the mine to function as one operation from both sides of US 53, it did not present details. As described in the Alternatives Development Report (Kimley-Horn, 2014; provided in Appendix K), consolidation of right-of-way and constructing a bridge for mine access were considered but determined to not provide a meaningful reduction in overall project costs or provide the mine with access to much of the existing easement agreement area to mine to offset reconstruction costs; therefore, these elements are not being further evaluated.

This alternative was found in the SD/Draft SDD (February 2012) to meet all four need criteria. This alternative would indirectly honor the terms of the existing easement agreement (Need #1) by compensating the landowner and operator for land and mineral rights.

■ Area of Evaluation

Under the Existing US 53 Alternative, no construction would occur, and traffic would remain on existing US 53. Therefore, the area evaluated includes the existing right-of-way/easement agreement area of existing US 53.

2.3.3 Alternative M-1



All of the Build Alternatives under consideration in this Draft EIS assume construction of a new four-lane US 53 alignment. Alternative M-1 is routed through the active UTAC mine. The following details for this alternative have been refined since Scoping based on considerations of providing mine access to both sides of the new US 53 alignment, existing fill material stability, depth of current and future mining activity, embankment design in blasting zone, and structural options (bridge vs. engineered slopes).

■ New Alignment

From south to north, this alternative would depart from existing US 53 approximately at Cuyuna Drive in the Midway area of Virginia. Approximately one mile of new four-lane roadway would be constructed to

mostly follow the grade created by the partially-backfilled⁸ Auburn Pit through the UTAC mine. As shown on [Figure 2.1-5](#), the new alignment would connect back to existing US 53 approximately 1,000 feet east of the existing 12th Avenue traffic signal.

■ Local Access

Existing highway connections at MN 135 and 2nd Avenue would be reconstructed to maintain community access, reusing portions of the US 53 roadway to the extent possible. The MN 135 connection would require right-of-way acquisition or a new easement with RGGS and UTAC for the retained portion of existing US 53 within the mine setback area ([Figure 2.3-2](#)).

The MN 135 connection would be made by routing MN 135 on to a portion of the existing northbound US 53 highway segment south of the current US 53/MN 135 interchange. The new access would be at-grade, with the primary turning movement (westbound MN 135 to northbound US 53) facilitated with a free right turn lane. A left turn lane would be provided for the southbound US 53 to eastbound MN 135 turning movement. This intersection would be signalized (intersection geometry shown in [Figure 3.1-4](#)).

Due to the proximate location of Cuyuna Drive and the US 53/MN 135 intersection, local street access at Cuyuna Drive would be modified to provide adequate intersection spacing. Instead of providing Cuyuna Drive direct access from US 53, access would be provided from MN 135 to accommodate intersection spacing guidelines. As shown in [Figure 2.3-2](#), Cuyuna Drive would be connected to MN 135 by extending Midway Drive north near the new intersection with US 53. An interchange option for this US 53 connection to MN 135 is not feasible in this location because there is not adequate space necessary for an interchange above the mine wall without involving substantial business and residential relocations in Midway. There is approximately 800 feet between the edge of the Auburn Pit wall and Cuyuna Drive, so a compressed diamond interchange (assumed to be approximately 2,000 feet long) would either have 1,200 feet of the interchange supported by structure in the pit or would require the acquisition of multiple residential and business properties in the Midway neighborhood. Given the extent of impacts and constructability concerns, an interchange at MN 135/US 53 was determined to not be feasible.

The connection to 2nd Avenue would be made by using a portion of the existing US 53 highway between 2nd and 12th Avenues, which is outside of the existing easement agreement area segment that would be vacated. 2nd Avenue would be extended to create a new at-grade intersection approximately at the present location of Southern Drive in Virginia. This new Southern Drive intersection would be spaced approximately 1,000 feet east of the 12th Avenue traffic signal. The northbound segment of US 53 to be used for extension of 2nd Avenue currently features four bridge structures (a pair over 6th Avenue and a pair over a now vacated railroad corridor). The northbound bridges would remain in use, whereas the southbound bridges would be removed along with the southbound traffic lanes. Coordination with the local jurisdictions (County and City) would be necessary to make a determination regarding future ownership of these local connection roadways.

The local street connection of 6th Avenue and Southern Drive, which provides access to the Ridgewood area south of US 53, would be improved by the Alternative M-1 alignment by adding direct access to US 53 via the new Southern Drive intersection (which would also provide access to 2nd Avenue as described above). New street connections in Alternative M-1 would be made by retaining the 6th Avenue underpass of northbound US 53 as shown in [Figure 2.3-2](#). Southern Drive would be connected to US 53 at the Southern Drive at-grade intersection, with continued connectivity to the 6th Street underpass. This design would provide new access to US 53 for the Ridgewood neighborhood, while maintaining through traffic to 6th Avenue via the underpass.

■ Design Features

Alternative M-1 would cross a mine area that will remain active for many years. In order to reduce the potential conflict with remaining ferrous resource reserves, a constrained highway cross section ([Figure 2.3-3](#)) was assumed for US 53 through the mine for approximately one mile (4,950 feet). The constrained

⁸ Backfilled material is from local sources within the mine boundary. See Section 5.12 for more detail.

cross section assumed median and outside barriers and steep side slopes. The depth of the active mine south of this alignment currently ranges from 100 to 200 feet deep. Future mining along the west side of the mine may extend down 500 feet or more. The proposed right-of-way through the mine would encompass the full road footprint. Standard blasting best practices by the mine include a 300 foot setback from the edge of right-of-way. If this setback encumbers ferrous resources, the loss of access to these resources would be expected to be included in the negotiation for acquisition of right-of-way for this alternative.

Earthwork and/or structures (bridges) would be incorporated into the alignment design to allow for mine operations on both sides of the new alignment. The depth of the fill and compaction was important in determining whether the crossing could be on fill or if a structural solution would be required. Borings were conducted by MnDOT to confirm the condition of existing fill.⁹ A seismic study was also conducted to determine the potential effects of blasting on fill slopes and bridge structures within the mine area.¹⁰ As a result it was determined that an engineered fill could be used across most of the mine with bridges constructed in two locations to accommodate mining access needs. An all fill section would not allow mine equipment to cross the road, and an all bridge section would be more costly with no additional benefit gained.

The engineered fill could be constructed with 1:2 slopes, minimizing the footprint of the fill section in the mine. The depth of the active mine south of this alignment currently ranges from 100 to 200 feet deep. Future mining along the west side of the mine may extend down 500 feet or more.

To address potential mine business risks (air quality compliance issues), a covering over a portion of the Auburn Pit crossing (an elevated tunnel concept) was evaluated as a potential mitigation strategy. This tunnel could be constructed with concrete barrier walls on each side supporting a three-sided concrete box structure to enclose the road and air handling equipment. Details of the tunnel construction assumptions can be found in Highway 53 M-1 Alignment Air Quality Mitigation Assessment (CH2M Hill, 2013) and the Structural Cost Estimate for Elevated Tunnel for US 53 Alternative M-1 Air Quality Mitigation (Kimley-Horn, 2013) provided in **Appendix E**.

This alternative was found in the SD/Draft SDD (February 2012) to meet all four need criteria.

■ Area of Evaluation

The potential physical impacts from this alternative were evaluated for the area shown in **Figure 2.1-5**. Physical impacts can be defined as areas where ground disturbance is likely to occur under one or more construction option. As noted above, this alternative would require fill across much of the Auburn Pit. The area of evaluation for Alternative M-1 represents the assumed alignment and extends to the bottom of the fill slope or the estimated limits of construction. It also includes areas anticipated for stormwater management and local road connections.

2.3.4 Alternative E-1A



Alternative E-1A is routed through the UTAC permit to mine and environmental setting boundaries, north of existing US 53 (see **Figure 2.2-1**). This alternative was added through the amended Scoping process described in Section 2.2.

Alternative E-1 was initially not carried forward because of the potential for mine business risks due to air quality compliance concerns (compared to other East Corridor alternatives), higher right-of-way costs due to conflicts with the existing UTAC permit to mine area and environmental setting boundary, and construction costs due to crossing the widest portion of the Rouchleau Pit. However, additional assessment of construction options and modification of this alternative determined

⁹ Preliminary Geotechnical Engineering Report for the TH 53 Relocation: M-1 Foundations (Gale-Tec Engineering, 2013); available at <http://www.dot.state.mn.us/d1/projects/hwy53relocation/TechnicalReports.html>

¹⁰ Proposed TH 53 M-1 (and E-2) Alignment, Virginia, MN: Report of Seismic Study of Mine Blast Induced Vibrations (HDR, 2013); available at <http://www.dot.state.mn.us/d1/projects/hwy53relocation/TechnicalReports.html>

that Alternative E-1A could reduce the business risk impacts from mine air quality compliance concerns. The features of this alternative assumed for analysis in this Draft EIS are described below.

■ **New Alignment**

From south to north, this alternative diverges from existing US 53 just north of Cuyuna Drive. The alignment crosses MN 135 between the existing US 53 interchange and Bourgin Road. The new alignment then continues parallel to Bourgin Road before turning to the northwest to cross the Rouchleau Pit along an existing submerged haul road embankment.¹¹ After crossing the pit, the alignment turns to the southwest to reconnect with existing US 53 near 2nd Avenue. The road cross section was assumed to be constrained across the Rouchleau Pit (four lanes with a two-foot wide median barrier). A barrier would be considered on the south side of the roadway for safety and screening reasons. All stormwater would be treated and/or removed from the roadway and not discharged directly into the Rouchleau Pit. The storm sewer system would also allow containment of any potential spills on the roadway.

Two construction design options for crossing the Rouchleau Pit are evaluated for this alternative. The first is a reinforced soil slope (RSS) causeway/fill section (RSS Option). The second option is a bridge crossing of the pit (Bridge Option). Both options would follow the existing submerged haul road across the Rouchleau Pit.

- **RSS Option:** This option would require the placement of fill below the existing water level and extending up to 160 feet in elevation above the water line. To minimize the fill footprint, a steep fill slope (up to 60% slope) would be required, and the height of the road would be kept as low as possible across the pit, resulting in a low point near the middle of the crossing. (Construction methods [i.e., dry vs. wet fill placement] for this design option are described in Section 5.3.3.2.) This option may require a future bridge (75 feet by 165 feet) to be constructed east of the Rouchleau Pit to allow for mining access to the north of the new alignment.
- **Bridge Option:** This option would place the road on a bridge structure across the pit, eliminating the need for fill within the Rouchleau Pit and allowing the road elevation to be increased and drain to the west side of the pit. This bridge would allow for future mine access to the north but may restrict distance from the bridge that mining/blasting activity may occur.

Any trail (pedestrian, bicycle, ATV, snowmobile) access to the south side of the highway would be prohibited due to mine safety concerns. The Mesabi Trail and utilities may be allowed within MnDOT right-of-way (with the trail on the north side of the highway, away from the mine activity) via a permit (may be constructed in conjunction with the project but funded by the trail and utility owners/operators; the St. Louis and Lake Counties Regional Railroad Authority (SLLCRRA) and the utility owners have received state bond funds for utility and trail relocation).

■ **Local Access**

The 2nd Avenue interchange would be replaced with a full access, at-grade, signalized intersection, similar to Alternative E-2 (Figure 2.3-4). This improves access (currently no southbound to westbound movement available) while eliminating the right-of-way and maintenance needed for the existing interchange loop and bridges.

There are two intersection options evaluated for MN 135 at US 53.

- **Intersection Option:** An unsignalized, $\frac{3}{4}$ intersection¹² would be used at the US 53/MN 135 intersection, with no left turns allowed from westbound MN 135 to US 53

¹¹ Backfilled material in this haul road is from local sources within the mine boundary. See Section 5.12 for more detail.

¹² A $\frac{3}{4}$ intersection (also known as a right-in/right-out/left-in-only intersection) permits access from the through approach (US 53) and the stop-controlled approach (MN 135) via right-turn movements and allows the left-turn movement from the through approach (US 53) to the stop-controlled approach (MN 135).

(intersection geometry shown in [Figure 2.3-5](#)).

- **Interchange Option:** A compressed diamond interchange would provide full access between US 53 and MN 135, as shown in [Figure 2.3-5](#).

The Landfill Road intersection with MN 135 would remain at its current location. A short segment of Landfill Road would need to be shifted east due to elevation differences between it and the new US 53 alignment.

■ Design Features

This alternative is within the UTAC permit to mine and environmental setting boundaries, although little further conflict with remaining ferrous resources is anticipated. In order to reduce the amount of fill within the Rouchleau Pit, a constrained highway cross section ([Figure 2.3-3](#)) was assumed for US 53 through the pit for approximately one-half mile (2,800 feet). The constrained cross section assumed median and outside barriers under both the RSS and Bridge Options.

- **RSS Option:** This option would allow for a shallower crossing of the Rouchleau Pit along an existing submerged haul road embankment. The pit may be partially dewatered or local construction dewatering (e.g., coffer dam) may be used, and the road would be constructed via a fill section through the pit. A mine access bridge southeast of the Rouchleau Pit could eventually be constructed in the future, if needed, to allow for mine vehicle passage under US 53 above the current water line.

A number of dewatering discharge options have been evaluated to inform potential construction impact analysis. Details regarding the options assessed can be found in the TH 53 Relocation Alternative E-1A RSS Construction Option Water Management Study (HDR, 2014), provided in [Appendix G](#). The effects of constructing the Rouchleau Pit crossing in the dry (via pit drawdown or localized dewatering) and in the wet (fill placed below water) condition are evaluated in Sections 5.2 and 5.3, providing a summary of the recommended options for dewatering discharge and their potential impacts.

- **Bridge Option:** The pit is approximately five to 25 feet deep at the crossing location, and the bridge would span approximately 3,000 feet. The alignment would follow the submerged haul road embankment to minimize pier height. This option must consider design criteria to withstand blasting operations in the adjacent mine and areas of potential unstable fill.

This alternative was found in the ASDD (September 2013) to meet all four need criteria.

■ Area of Evaluation

The potential physical impacts from this alternative were evaluated for the area shown in [Figure 2.2-1](#). Physical impacts can be defined as areas where ground disturbance is likely to occur under one or more construction option. As noted above, this alternative includes two options for crossing the Rouchleau Pit generally following the submerged haul road. The area of evaluation was widened across the Rouchleau Pit for Alternative E-1A in areas where there is potential for design adjustments in the alignment to accommodate currently undefined solutions to known engineering challenges (e.g., existing areas of unstable fill and bridge type). The intent of evaluating the wider area was to identify potential impacts and determine if there were any environmental resources that could limit implementation of the design options being considered. As determined by analysis of aerial photography and data collection within the widened area of evaluation, it generally has consistent vegetation/cover types (i.e., mostly forested with some wetlands, or rock pit walls and water) and has no existing development or noise receptors. Since most of the widened area is within the previously mined area in and adjacent to the Rouchleau Pit, the alignment adjustments should result in little difference in impacts to resources except for ferrous resources and right-of-way. Impacts to vegetation and wetlands were determined to be similar regardless of where the final alignment would be oriented within the widened area (see Chapter 4: Community and Social Analysis and Chapter 5: Physical and Environmental Analysis for more details). To calculate

potential impacts without overestimating them due to the widened area of evaluation, a corridor averaging 200-400 feet wide was assumed for Alternative E-1A within the area of evaluation.

2.3.5 Alternative E-2



Alternative E-2 is routed around the UTAC permit to mine and environmental setting boundaries. The following details for this alternative have been refined since Scoping based on considerations of crossing the Rouchleau Pit, structural vs. fill options, bridge design in blasting zone, depth of pit, lands permitted or leased for mine operations, and construction staging considerations.¹³

■ New Alignment

From south to north, Alternative E-2 generally follows existing US 53 from the Midway area to the MN 135 exit ramp for the start of new four-lane construction. As shown in [Figure 2.1-6](#), the new alignment then continues on a northeasterly track on the present day Landfill Road corridor before turning to the west to cross over the Rouchleau Pit. Upon crossing the pit, Alternative E-2 turns to the southwest following an abandoned railroad corridor that runs between the pit and residential neighborhoods before reconnecting to existing US 53 at 2nd Avenue. Areas of roadway that would be removed are shown in [Figure 2.3-6](#).

Two alignments are being considered for Alternative E-2 between Midway and roughly MN 135.¹⁴ Both options extend from a point just north of Cuyuna Drive on the south end to approximately the point where the Mesabi Trail crosses existing Landfill Road just north of the MN 135.

- **Straight Option:** This is a westerly route that follows existing US 53 and the exit ramp to MN 135. This option minimizes new disturbance by following existing roads to the extent possible. The area of evaluation for this option includes a wider section just south of MN 135 to allow for design flexibility to shift the alignment east of the existing easement agreement area, if needed, to minimize mining setback and wetland impacts.
- **Curved Setback Option:** This route shifts east of existing US 53, similar to the alignment of Alternative E-1A south of MN 135. The purpose of this option is to facilitate staging of project construction and to minimize or potentially avoid encroachment on the mine setback from the road, shifting the alignment to the east at least 300 feet. The actual alignment shift exceeds 300 feet to also minimize impacts to the wetland that is located between US 53 and this option.

■ Local Access

The 2nd Avenue access would be converted from the existing partial interchange to an at-grade intersection. The existing 2nd Avenue interchange does not allow for turns from southbound US 53 to 2nd Avenue or from 2nd Avenue to northbound US 53. The new 2nd Avenue intersection would provide access to and from US 53 in all directions. Both intersections would be signalized (intersection geometry shown in [Figure 3.1-5](#)).

There are two intersection options evaluated for MN 135 at US 53.

- **Intersection Option:** With this option, as shown in [Figure 2.3-7](#), MN 135 would be slightly realigned to accommodate a new at-grade intersection with US 53, replacing the existing interchange. An unsignalized, $\frac{3}{4}$ intersection would be used at the US 53/MN 135 intersection, with no left turns allowed from westbound MN 135 to US 53 (intersection geometry shown in [Figure 3.1-5](#)).

¹³ Alignment development details are further described in the Alternatives Development Report in [Appendix K](#). Permitted and leased mining operations are defined in Section 4.2.

¹⁴ The Alternative E-2 Curved Setback Option was developed after the completion of the Alternatives Development Report and, therefore, is not discussed in that document.

- **Interchange Option:** With this option, a compressed diamond interchange would be constructed to provide full access between US 53 and MN 135, as shown in [Figure 2.3-7](#).

Access to Landfill Road would be maintained with a new at-grade connection approximately one-half mile north of the new US 53/MN 135 intersection. A median break in the US 53 corridor would allow for access to Landfill Road for travelers from both directions on US 53.

■ **Design Features**

A constrained highway cross section between the new Landfill Road access and 2nd Avenue, approximately one mile (5,500 feet) long, was assumed in order to reduce the potential impacts of the Alternative E-2 route along the west side of and across the Rouchleau Pit. The constrained cross section assumed median and outside barriers and steep side slopes ([Figure 2.3-3](#)). East of the Rouchleau Pit a continuation of the existing cross section from the south is planned. The new Landfill Road access median break was assumed to be located outside of the constrained cross section. The US 53 median at Landfill Road would provide a refuge for vehicles making turning movements across US 53 at Landfill Road.

The most feasible pit crossing method for this alternative was determined to be a bridge; a fill option was eliminated based on constructability issues. A fill section across the pit is not expected to be feasible due to the depth of the water and pit and the width of the fill footprint at this location. At 1:2 slopes the fill footprint at the bottom of the fill would be at least 950 feet wide and require nearly 10 million cubic yards of fill material; with more reasonable slopes of 1:4, the footprint and fill material needed would double. Additionally, given the depth of water to be contained on the north side of the fill (125 feet currently), the fill would require engineering for a dam to support the water pressure as well as blasting vibration. The dam design would also need to consider future water level fluctuations as dewatering changes occur. Given the extent of constructability concerns and costs compared to a bridge, the fill option was dropped from further consideration for this alternative.

Therefore, a bridge would be used to cross the Rouchleau Pit. The pit is approximately 250 feet deep at the crossing location, and the bridge would span approximately 1,350 feet. Crossing primarily on structure would minimize potential fill quantity and stability concerns. This alternative must consider design criteria to withstand blasting operations in the adjacent mine. Constructability assessments have indicated that a bridge crossing of the pit represents comparable constructability issues and cost impacts as other alternatives.

This alternative was found in the SD/Draft SDD (February 2012) to meet all four need criteria.

■ **Area of Evaluation**

The potential physical impacts from this alternative were evaluated for the area shown in [Figure 2.1-6](#). Physical impacts can be defined as areas where ground disturbance is likely to occur under one or more construction option. As noted above, this alternative includes a bridge crossing over the Rouchleau Pit. The area of evaluation was widened across the Rouchleau Pit for Alternative E-2 in areas where there is potential for design adjustments in the alignment to accommodate currently undefined solutions to known engineering challenges (e.g., existing areas of unstable fill and bridge type). The intent of evaluating the wider area was to identify potential impacts and determine if there were any environmental resources that could limit implementation of the design options being considered. As determined by analysis of aerial photography and data collection within the widened area of evaluation near the Rouchleau Pit, it generally has consistent vegetation/cover types (i.e., mostly forested with some wetlands, or rock pit walls and water) and has no existing development or noise receptors. Since most of the widened area is within the previously mined area in and adjacent to the Rouchleau Pit, the alignment adjustments should result in little difference in impacts to resources except for ferrous resources and right-of-way. Impacts to vegetation and wetlands were determined to be similar regardless of where the final alignment would be oriented within the widened area (see Chapter 4: Community and Social Analysis and Chapter 5: Physical and Environmental Analysis for more details). To calculate potential impacts without overestimating them due to the widened area of evaluation, a corridor averaging 150-300 feet wide was assumed for Alternative E-2 within the area of evaluation.

2.4 Selection of a Preferred Alternative

Based on a variety of construction, cost, environmental, social, and economic factors, including mining operations and effects to the local economy, MnDOT has identified a preferred alternative. The reasoning used in selecting this alternative is described below. See Chapter 8: Consultation and Coordination for more information on agency and stakeholder involvement in the selection process.

2.4.1 Preferred Alternative



Alternative E-2 includes a 1,300-foot long bridge with 180-foot or taller bridge piers within the Rouchleau Pit. It is recommended as the preferred alternative based on its ability to meet the project Purpose and Need and minimize impacts to social, economic, and environmental resources, and on the basis of a number of technical and cost considerations, as described below. Both the Straight Option and Curved Setback Option are being carried forward with the preferred alternative for further refinement; however, one will be identified as the selected option in the Final EIS based on public and agency comment, refinement of the design, and overall environmental impacts.

The Interchange Option was selected for the preferred alternative over the Intersection Option. These options have similar social and environmental impacts; however, the Interchange Option would maintain the current access provided at US 53 and MN 135 and would provide safer approach grades from the east (two percent compared to six percent with an intersection). This reduction in grade would also reduce the earthwork and rock cut quantities required for construction.

Benefits of the preferred alternative include:

- Mineral Rights: Avoids the permit to mine/environmental setting boundary
- Business Risks: Has no risk for air quality compliance to impact mine operations
- Water Supply: Avoids the major dewatering that would be required for the Alternative E-1 RSS Option
- Wetlands: Both the Straight and Curved Setback Options have fewer wetland impacts than Alternative E-1A (RSS or Bridge Option). The Straight Option has fewer wetland impacts than Alternative M-1 and the Curved Setback Options has wetland impacts similar to Alternative M-1.
- Noise: A noise wall is preliminarily cost effective at affected residential locations
- Right-of-Way: Impacts the fewest number of parcels of any Build Alternative
- Engineering and Constructability Considerations:
 - Shorter bridge than the Alternative E-1A Bridge Option
 - Only two pier foundations required, compared to up to eight for the Alternative E-1A Bridge Option
 - Less work required to construct in the water/ice of the Rouchleau Pit
 - Avoids 40 mph curve needed for Alternative E-1A
 - Has a better sight distance northbound from the bridge to the 2nd Avenue traffic signal than Alternative E-1A
 - Piers to be constructed in less than 30 feet of mine waste fill as compared to Alternative E-1A that would have up to 100 feet of mine waste fill
- Schedule: Has the least schedule risk due to engineering constructability considerations noted above as well as considerations related to owner and operator property interests
- Cost: Costs significantly less than the Existing US 53 Alternative and Alternative M-1, and the upper range of the cost estimate is less than that for either the Alternative E-1A RSS Option or Bridge Option

The negative effects of this alternative include:

- **Mineral Rights:** More mineral encumbrance than Alternative E-1A; requires greater impact to School Trust land and, therefore, has potential for greater impact to Vermillion Gold, Inc.'s lease than Alternative E-1A
- **Section 4(f):** Impacts the OHVRA; however, the impact is negligible and meets the definition of de minimis
- **Vegetation/Cover Types:** Impacts more acres of forest than other alternatives; however, impacts to wildlife are negligible
- **Unknowns:** Requires additional geotechnical characterization at pier locations

2.4.2 Other Alternatives Considered

See Section 10.3.2 for more discussion on the rationale for rejecting the following alternatives.

2.4.2.1 No Build Alternative (Easement Agreement Area Closed)



The No Build Alternative was carried forward for analysis as the “do nothing alternative” because it was required for comparison to other alternatives. It is not identified as the preferred alternative since other Build Alternatives (i.e., M-1, E-1A, and E-2) would meet all of the identified project needs with less severe social, economic, and environmental impacts.

2.4.2.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)



The Existing US 53 Alternative would have substantially greater uncertainty and cost than any of the Build Alternatives; therefore, it was not selected as the preferred alternative.

2.4.2.3 Alternative M-1



Alternative M-1 has feasibility issues and would result in severe negative impacts that are not offset by the benefits in minimization; therefore, it was not identified as the preferred alternative.

2.4.2.4 Alternative E-1A



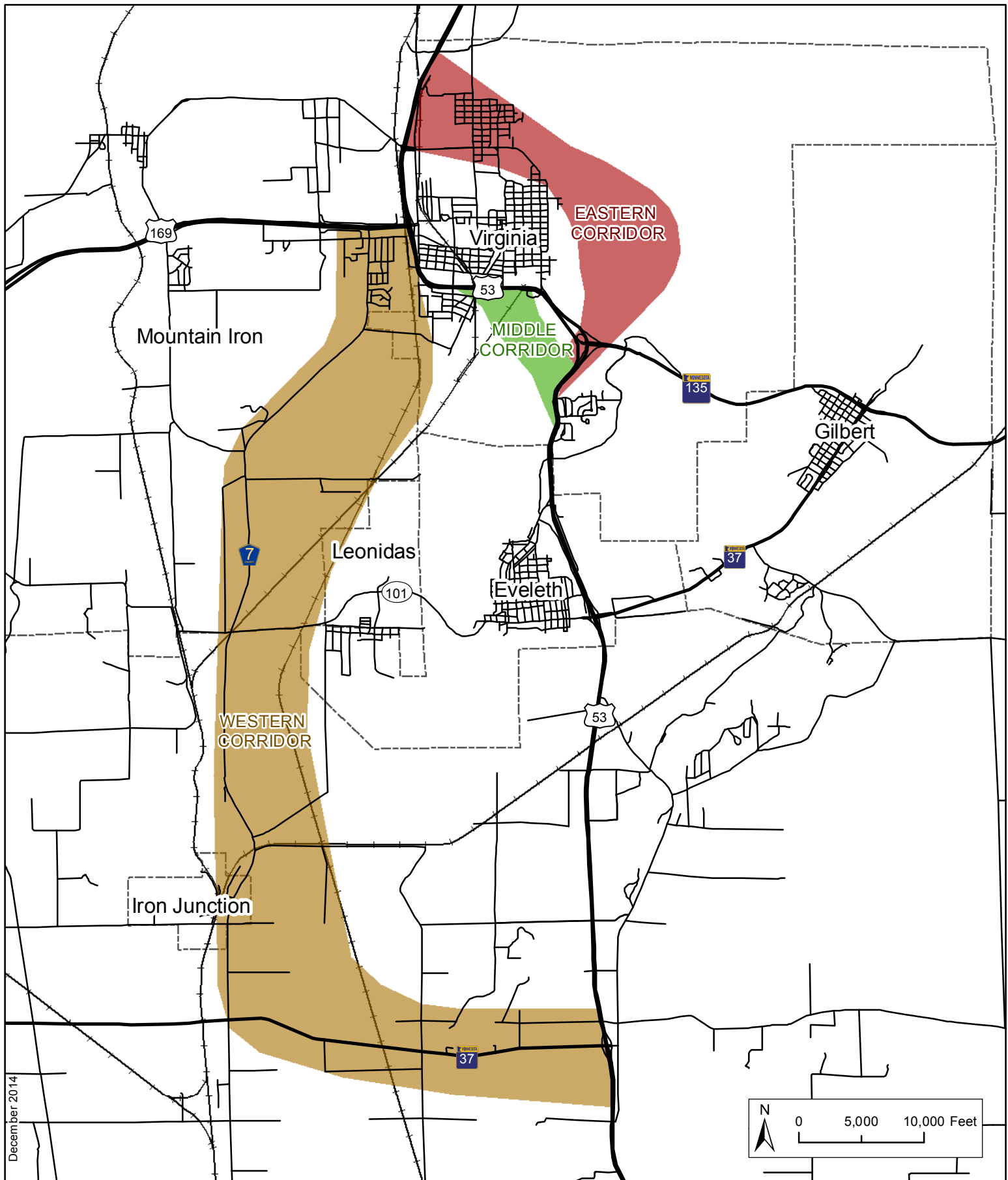
RSS Option

The Alternative E-1A RSS Option has feasibility issues and would result in severe schedule and constructability impacts (i.e., it is unlikely to meet the timeline due to dewatering, with substantial risks for additional delays due to weather, mine waste fill, and design requirements to mitigate constructability concerns) that are not offset by the benefits in

minimization of environmental impacts; therefore, it was not identified as the preferred alternative.

Bridge Option

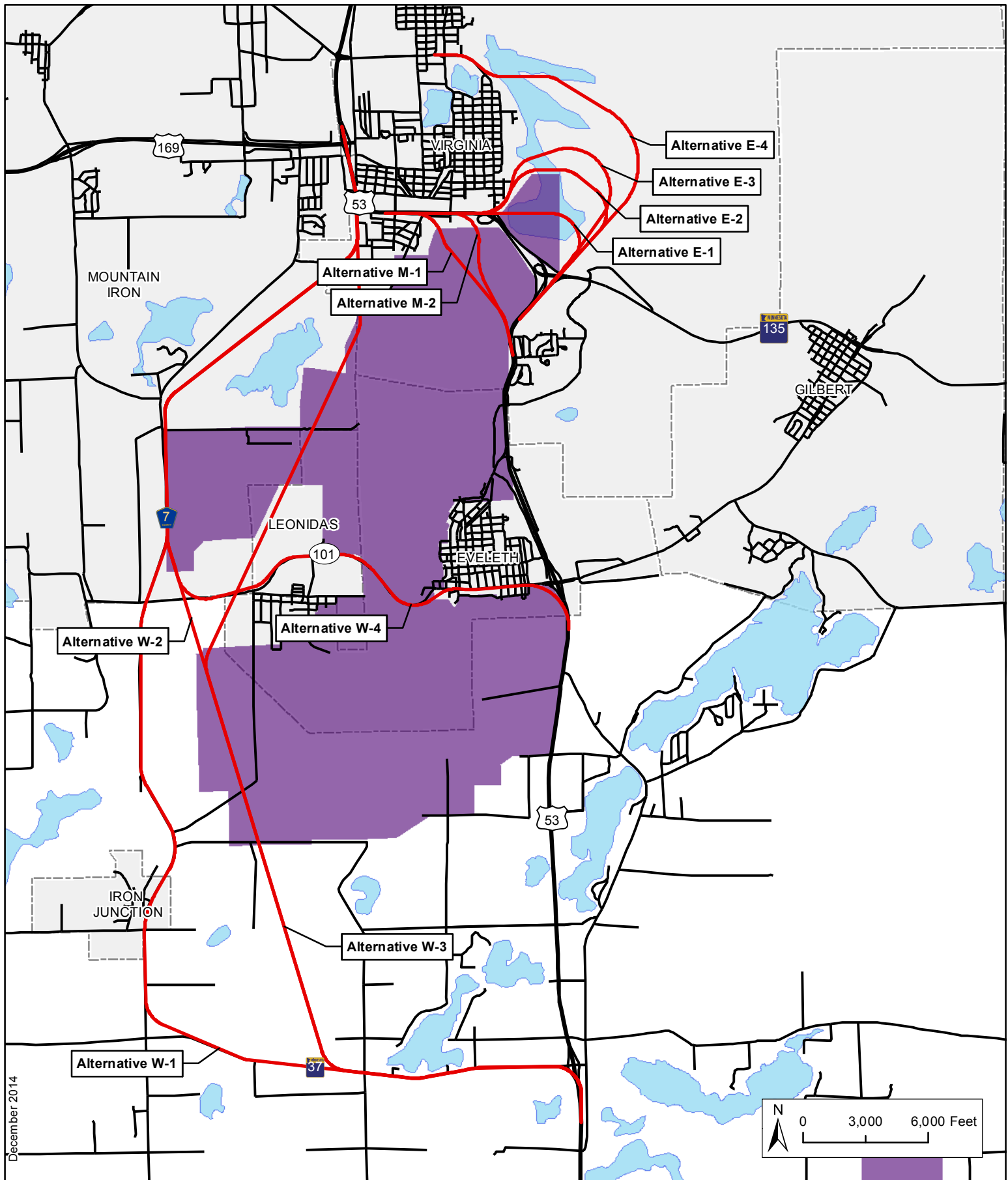
The Alternative E-1A Bridge Option has feasibility issues and would result in severe negative schedule impacts (i.e., it would require the greatest construction effort to meet the timeline, with substantial risks for delays due to weather, mine waste fill, and design requirements to mitigate constructability concerns) that are not offset by the benefits in minimization of environmental impacts; therefore, it was not identified as the preferred alternative.



December 2014



Figure 2.1-1
Studied Corridors
 US Highway 53 Virginia to Eveleth
 Draft Environmental Impact Statement



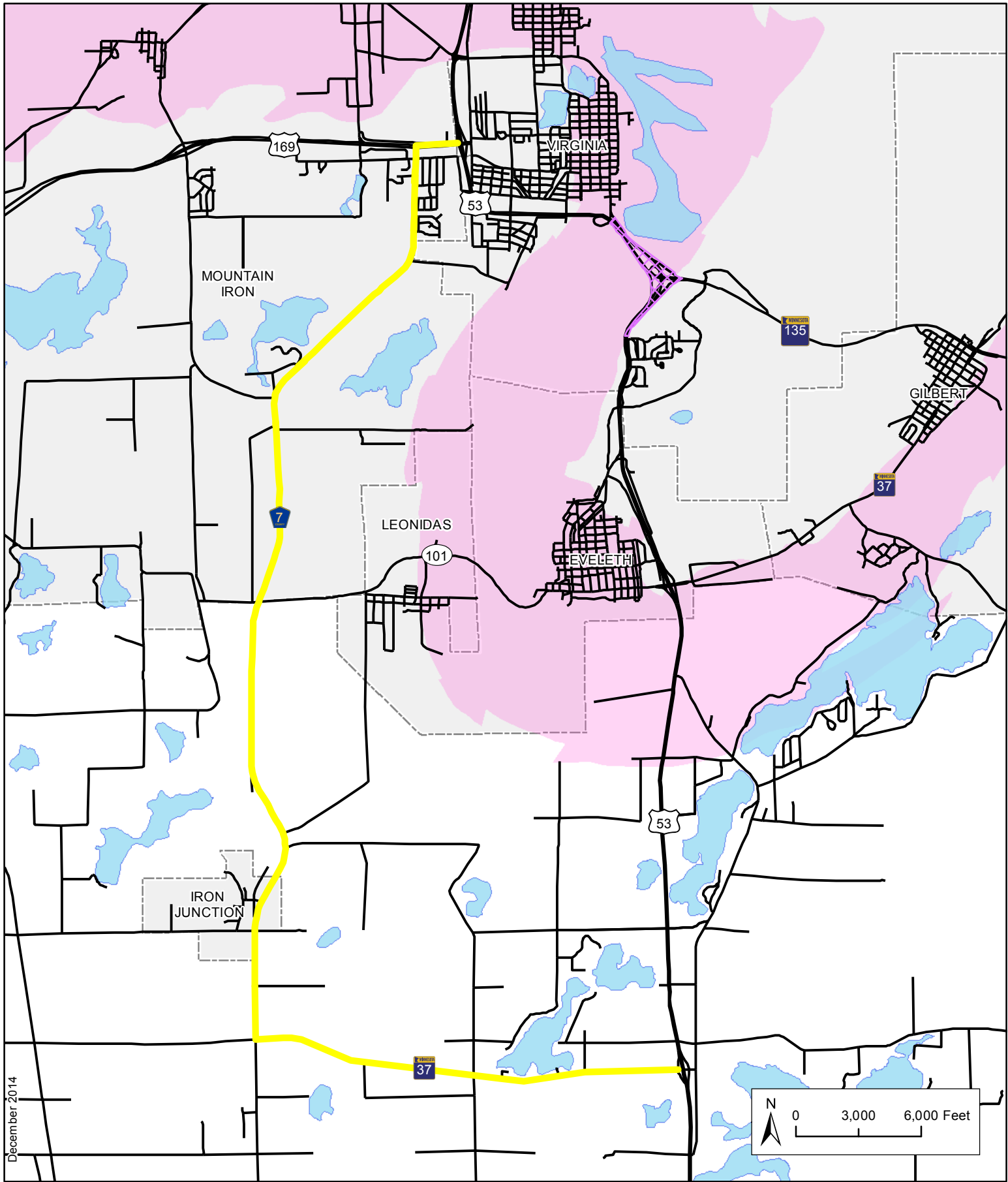
Source: Environmental Setting Boundary (DNR)







Legend

- 2012 Scoping Document Alternatives
- UTAC Environmental Setting Boundary
- Municipalities

Figure 2.1-2
2012 Scoping Document Alternatives
 US Highway 53 Virginia to Eveleth
 Draft Environmental Impact Statement



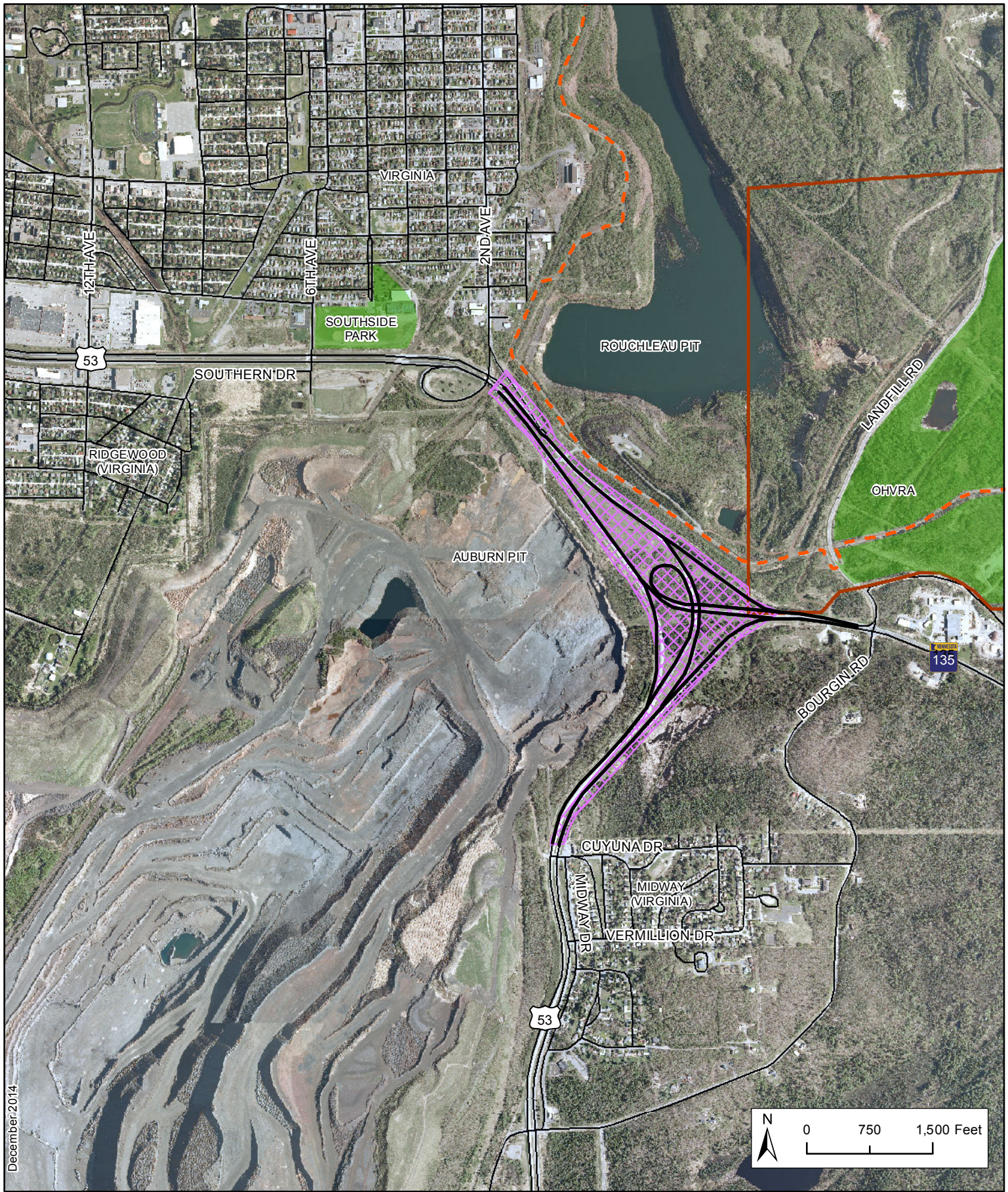
Legend

-  Existing US 53 Easement Agreement Area
-  No Build Alternative
-  Biwabik Iron Formation
-  Municipalities

December 2014



Figure 2.1-3
No Build Alternative
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement



Source: USGS Aerial 2011



Legend

- Existing US 53 Alternative
- Existing US 53 Easement Agreement Area
- Existing Mesabi Trail
- Existing School Trust Land

Figure 2.1-4
Existing US 53 Alternative
 US Highway 53 Virginia to Eveleth
 Draft Environmental Impact Statement

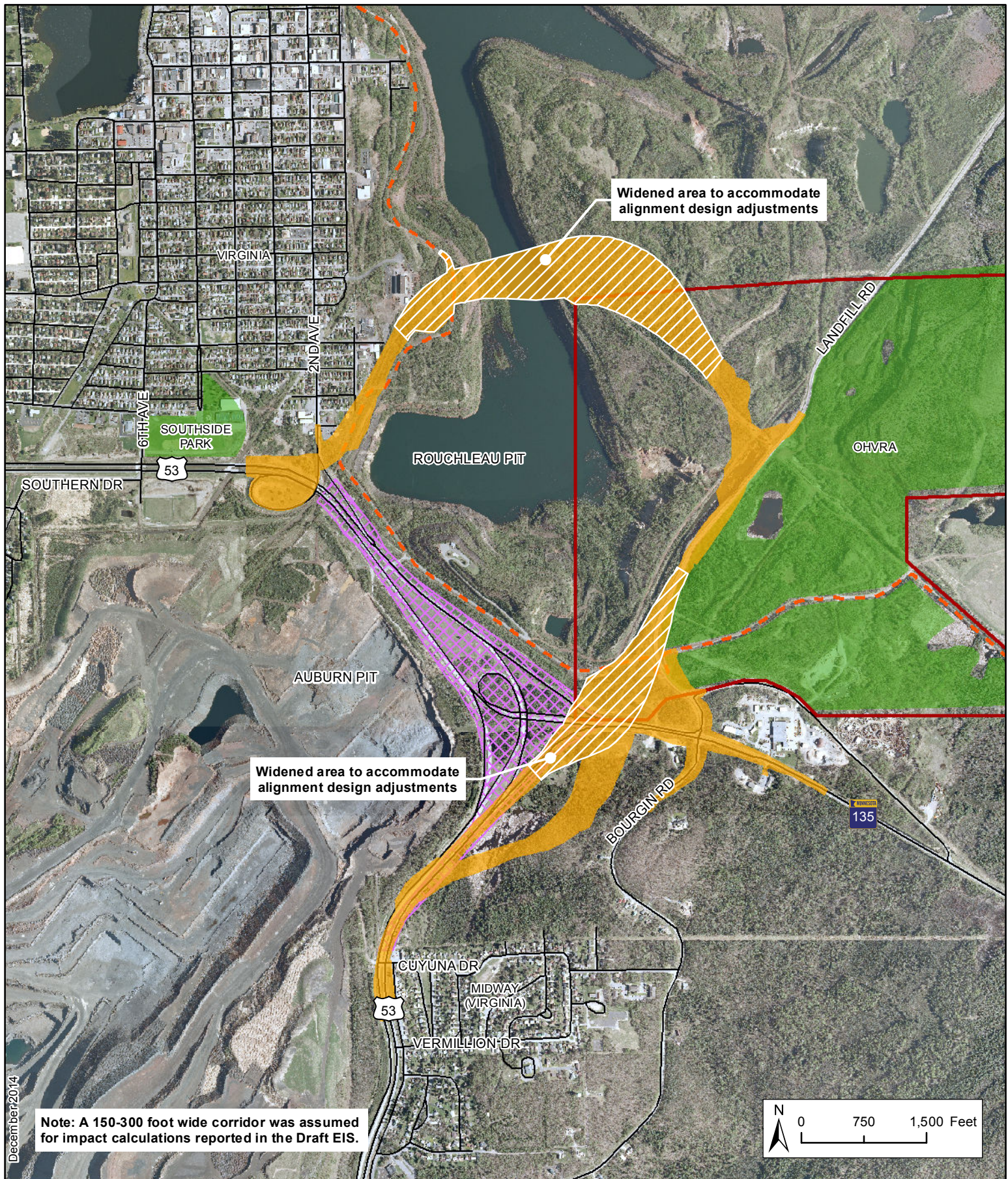


Legend

- | | |
|---|---|
| Alternative M-1 Area of Evaluation | Existing Public Recreation Land |
| Existing US 53 Easement Agreement Area | Existing School Trust Land |
| Existing Mesabi Trail | |



Figure 2.1-5
Alternative M-1
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement

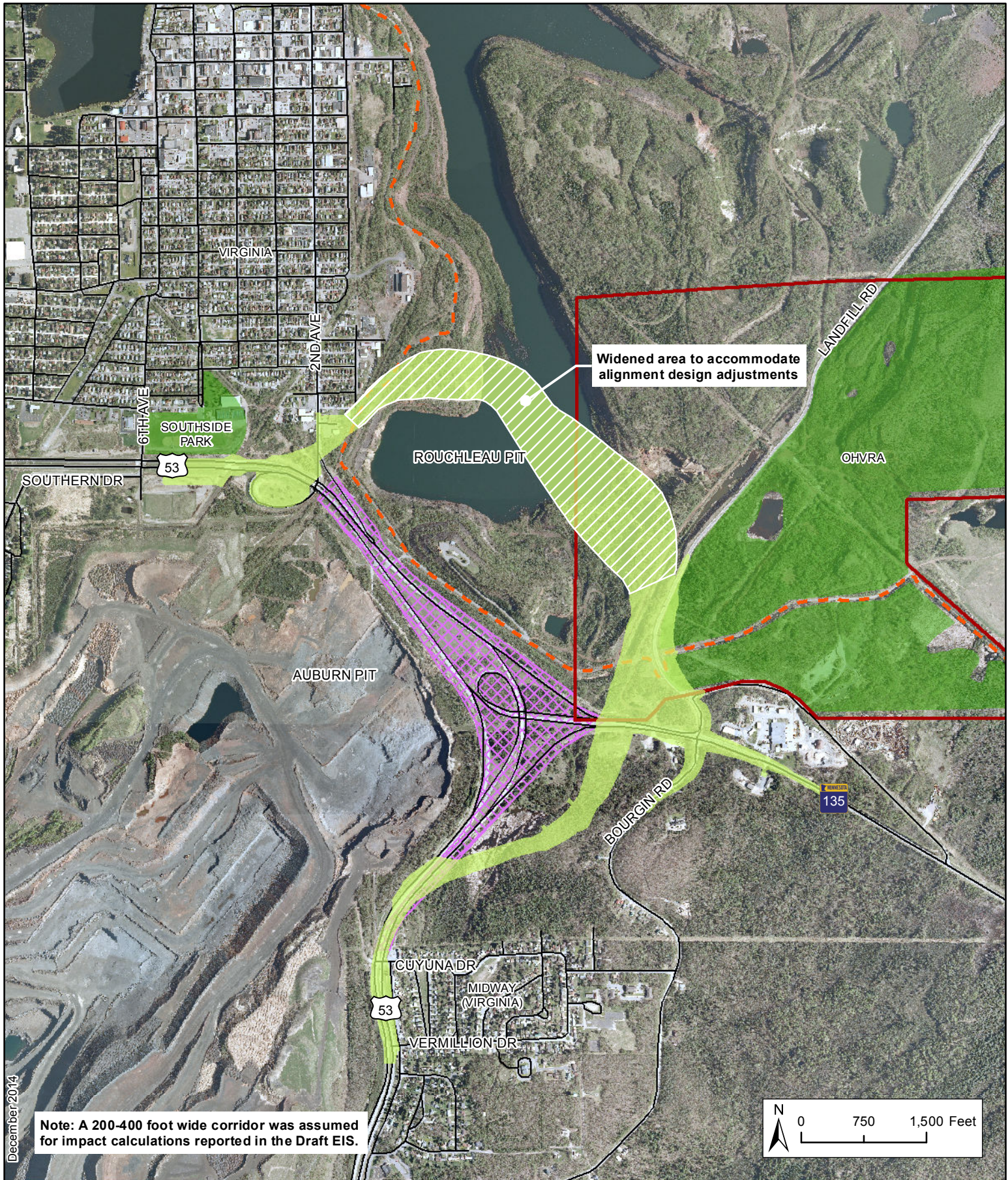


Legend

- Alternative E-2 Area of Evaluation
- Existing US 53 Easement Agreement Area
- Existing School Trust Land
- Existing Mesabi Trail
- Existing Public Recreation Land



Figure 2.1-6
Alternative E-2
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement

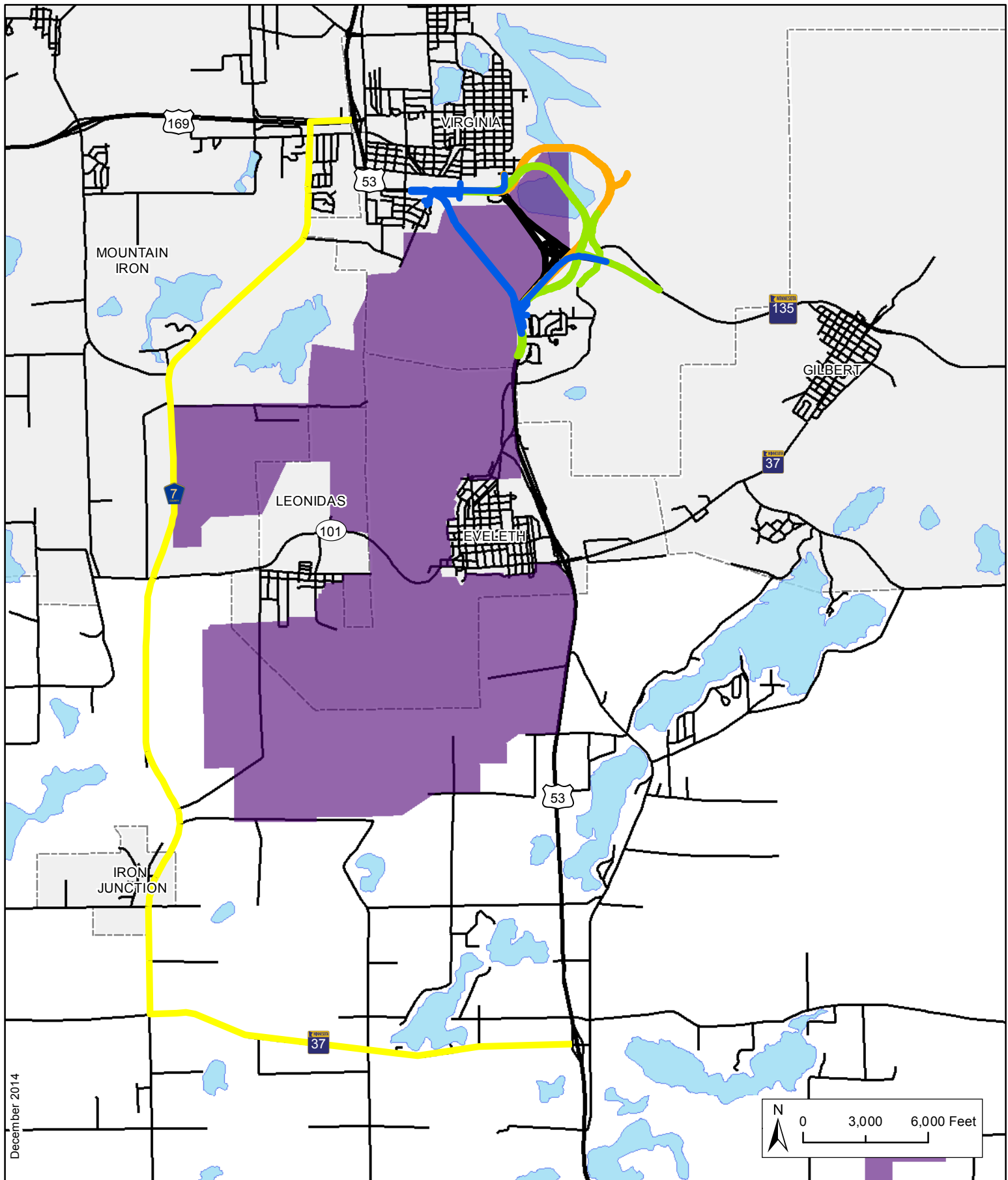


Legend

- | | |
|--|---|
|  Alternative E-1A Area of Evaluation |  Existing Mesabi Trail |
|  Existing US 53 Easement Agreement Area |  Existing Public Recreation Land |
|  Existing School Trust Land | |



Figure 2.2-1
Alternative E-1A
 US Highway 53 Virginia to Eveleth
 Draft Environmental Impact Statement



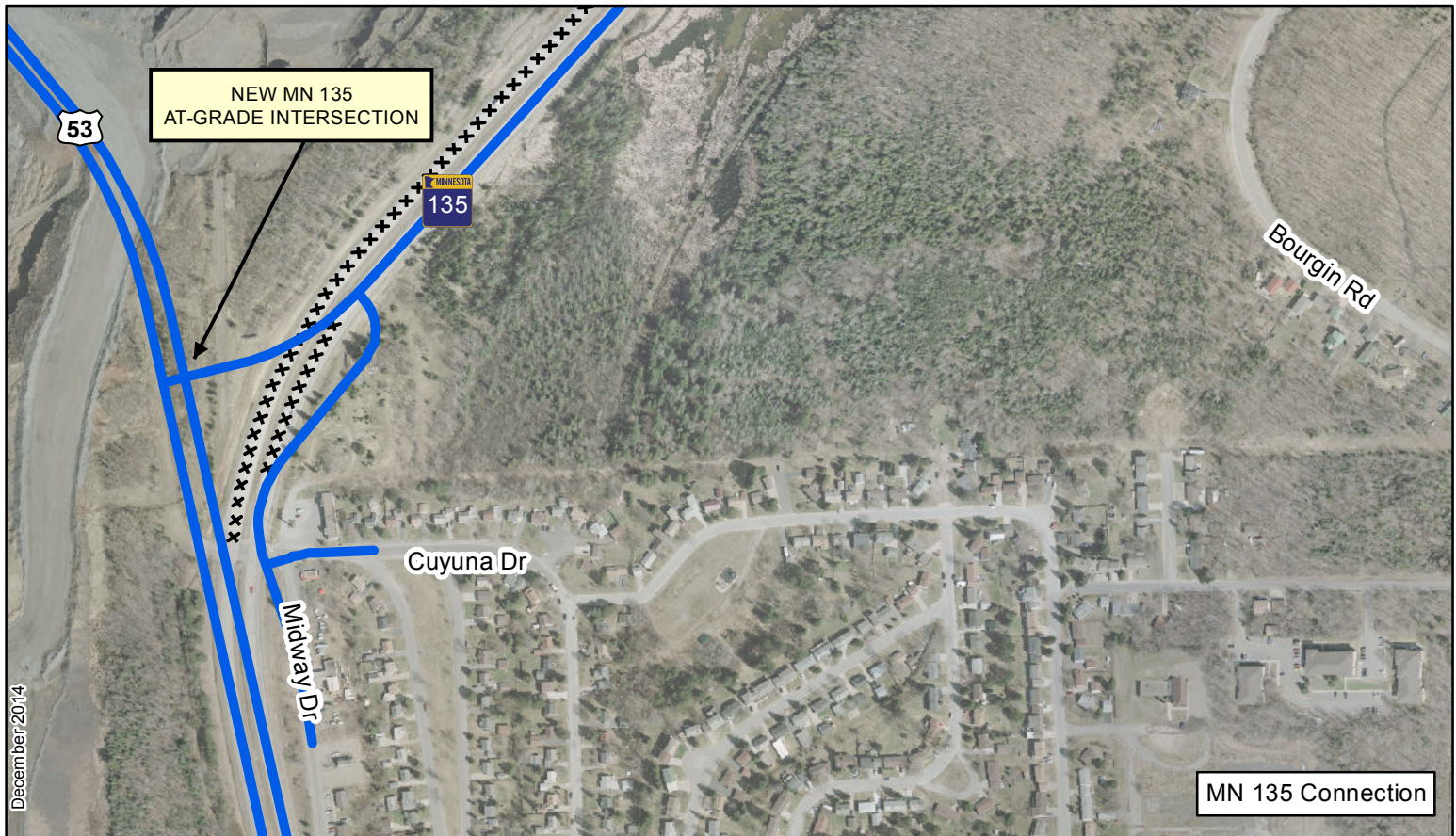
Source: Environmental Setting Boundary (DNR)

Legend

- | | |
|---|--|
| — No Build Alternative | — Alternative E-2 |
| — Existing US 53 Alternative | UTAC Environmental Setting Boundary |
| — Alternative M-1 | Municipalities |
| — Alternative E-1A | |



Figure 2.3-1
All Alternatives
 US Highway 53 Virginia to Eveleth
 Draft Environmental Impact Statement



Source: MnDOT Aerial 2011



Legend

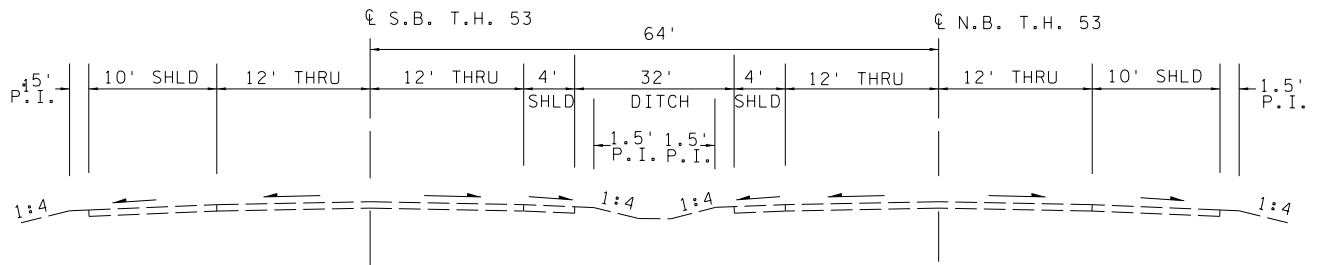
- Alternative M-1
- xxx Road Removed



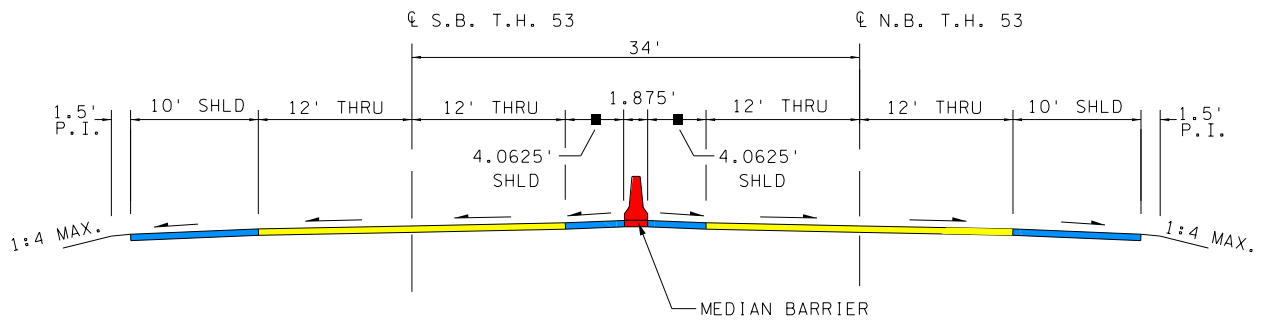
0 250 500 Feet

Figure 2.3-2
Alternative M-1
Local Street Connections
 US Highway 53 Virginia to Eveleth
 Draft Environmental Impact Statement

INPLACE US 53 TYPICAL SECTION



US 53 - CONSTRAINED TYPICAL SECTION

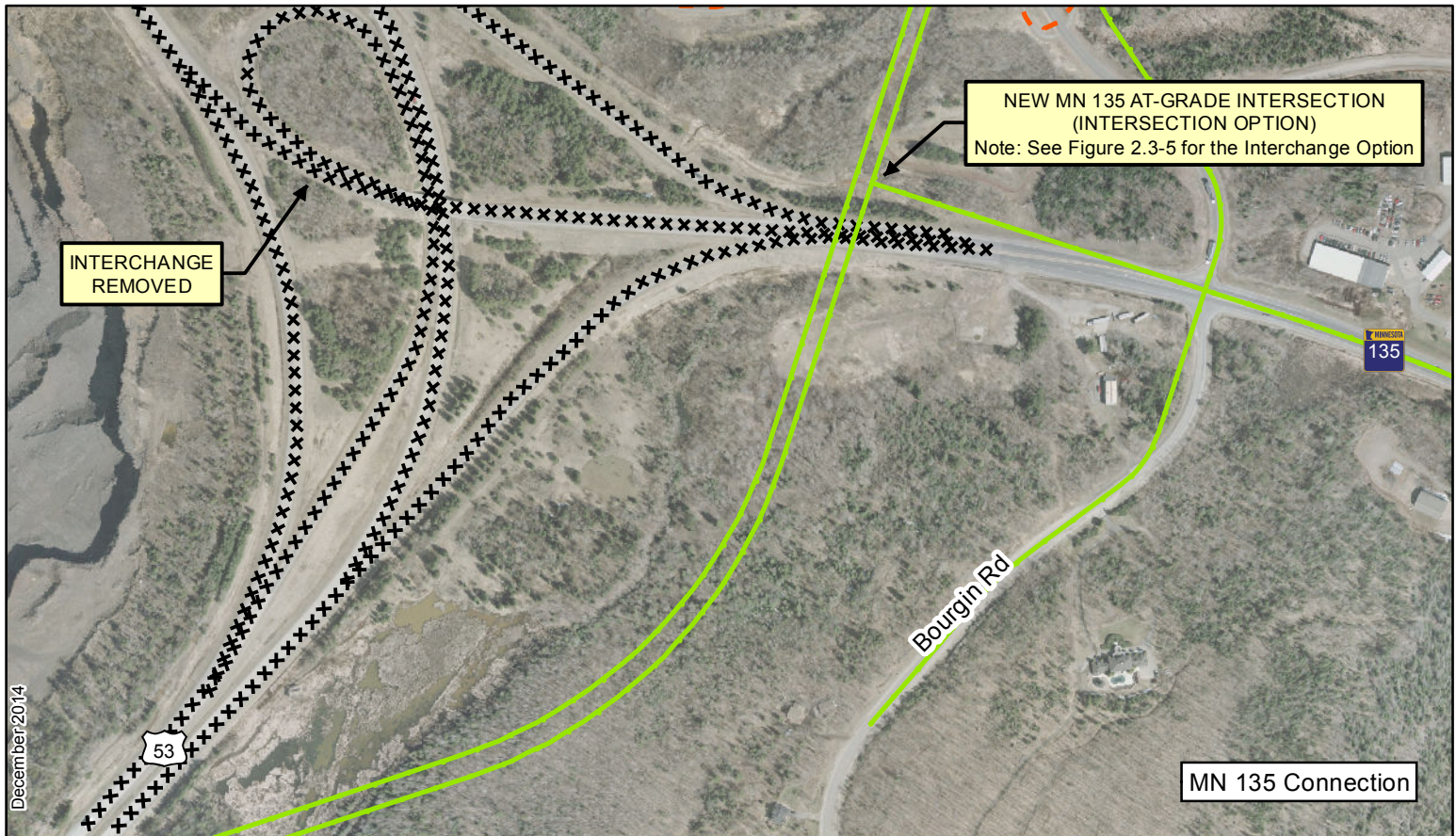
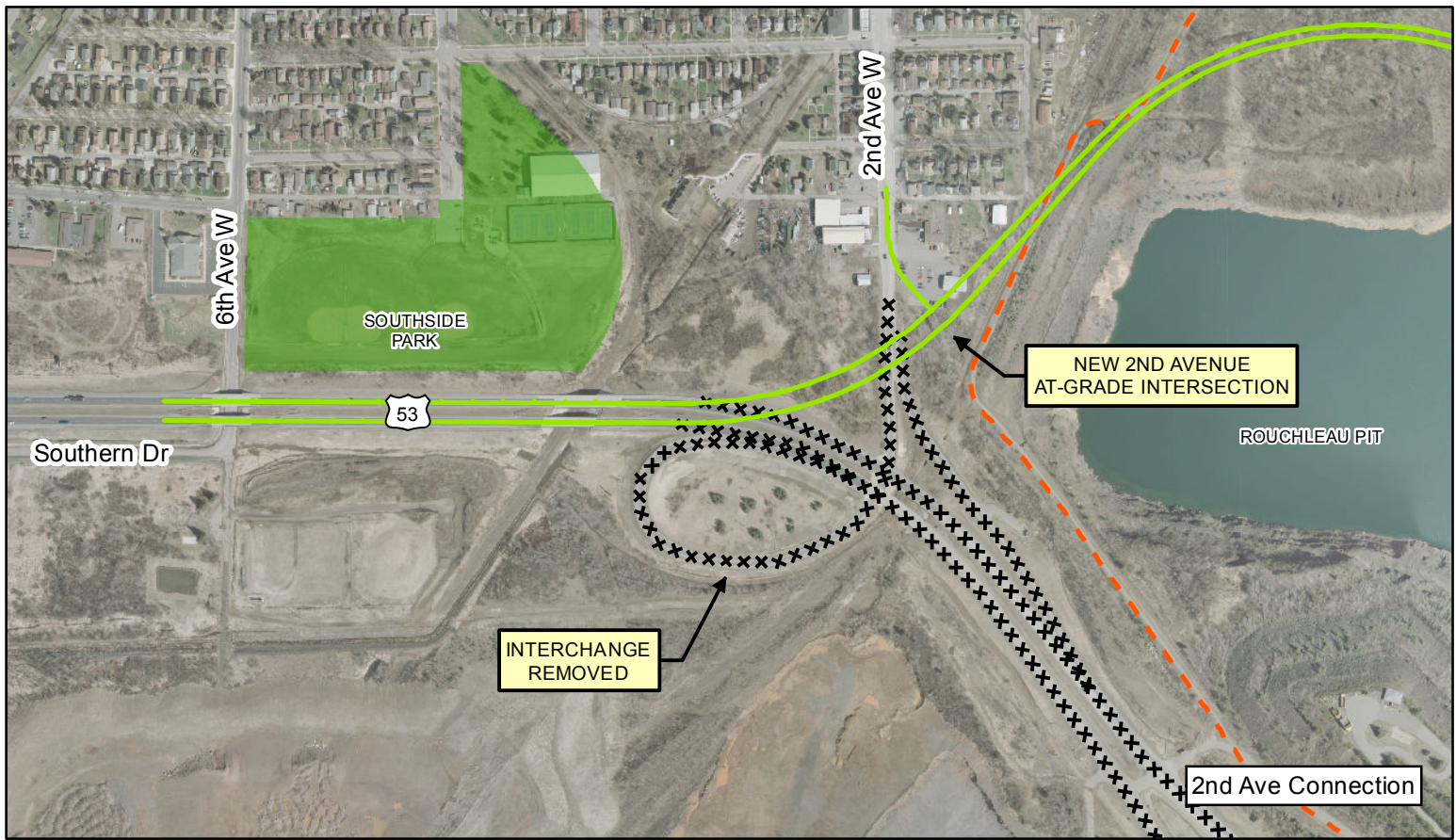


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Source: SEH Layout 11/27/2012



Figure 2.3-3
Existing and Constrained Typical Sections
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement



Source: MnDOT Aerial 2011



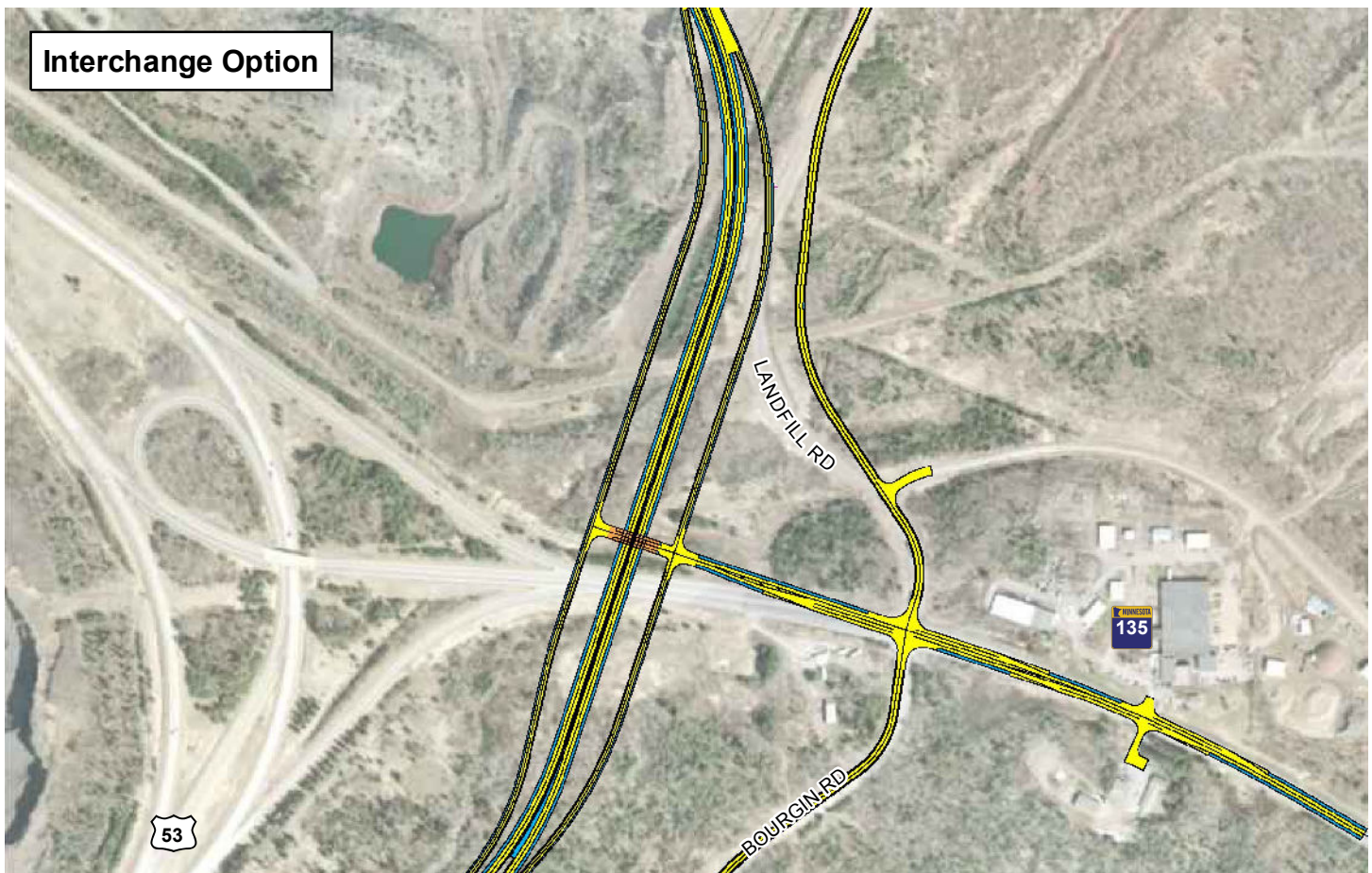
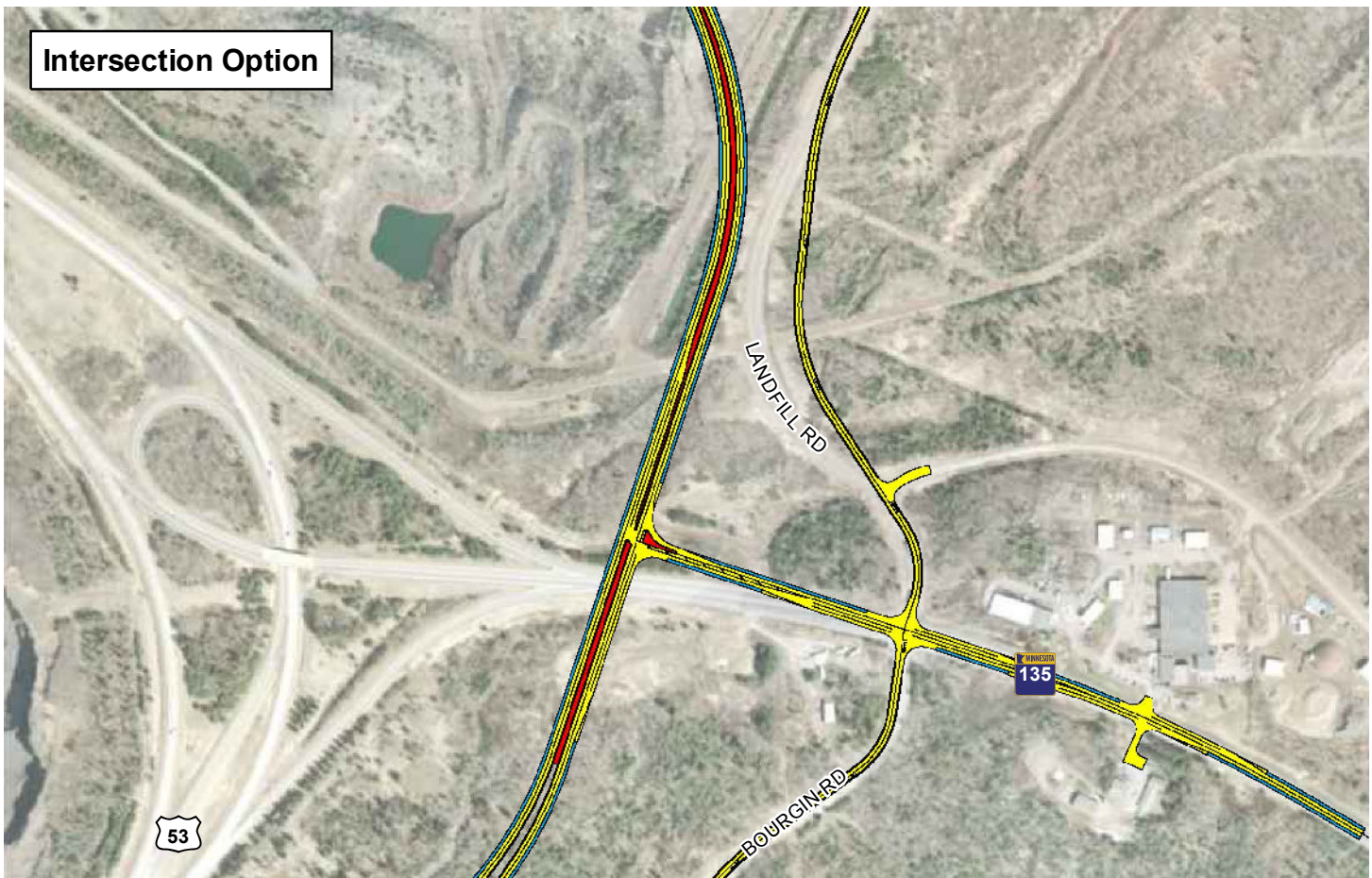
Legend

- Alternative E-1A
- Existing Mesabi Trail
- xxx Road Removals



0 250 500 Feet

Figure 2.3-4
Alternative E-1A
Local Street Connections
 US Highway 53 Virginia to Eveleth
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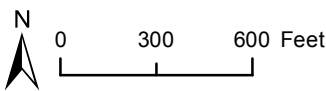
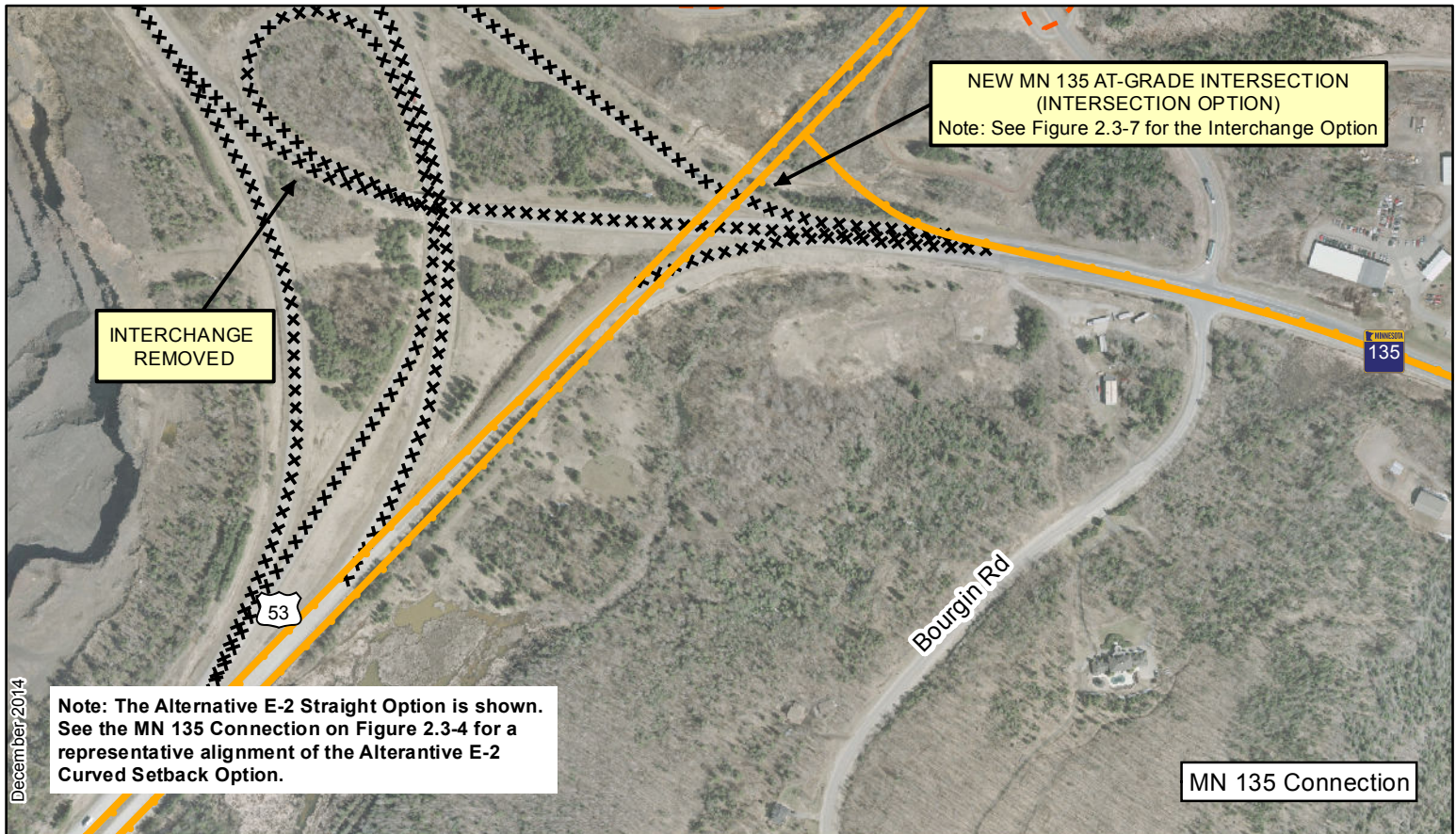


Figure 2.3-5
Alternative E-1A Intersection and Interchange Options
 US Highway 53 Virginia to Eveleth
 Draft Environmental Impact Statement



Source: MnDOT Aerial 2011



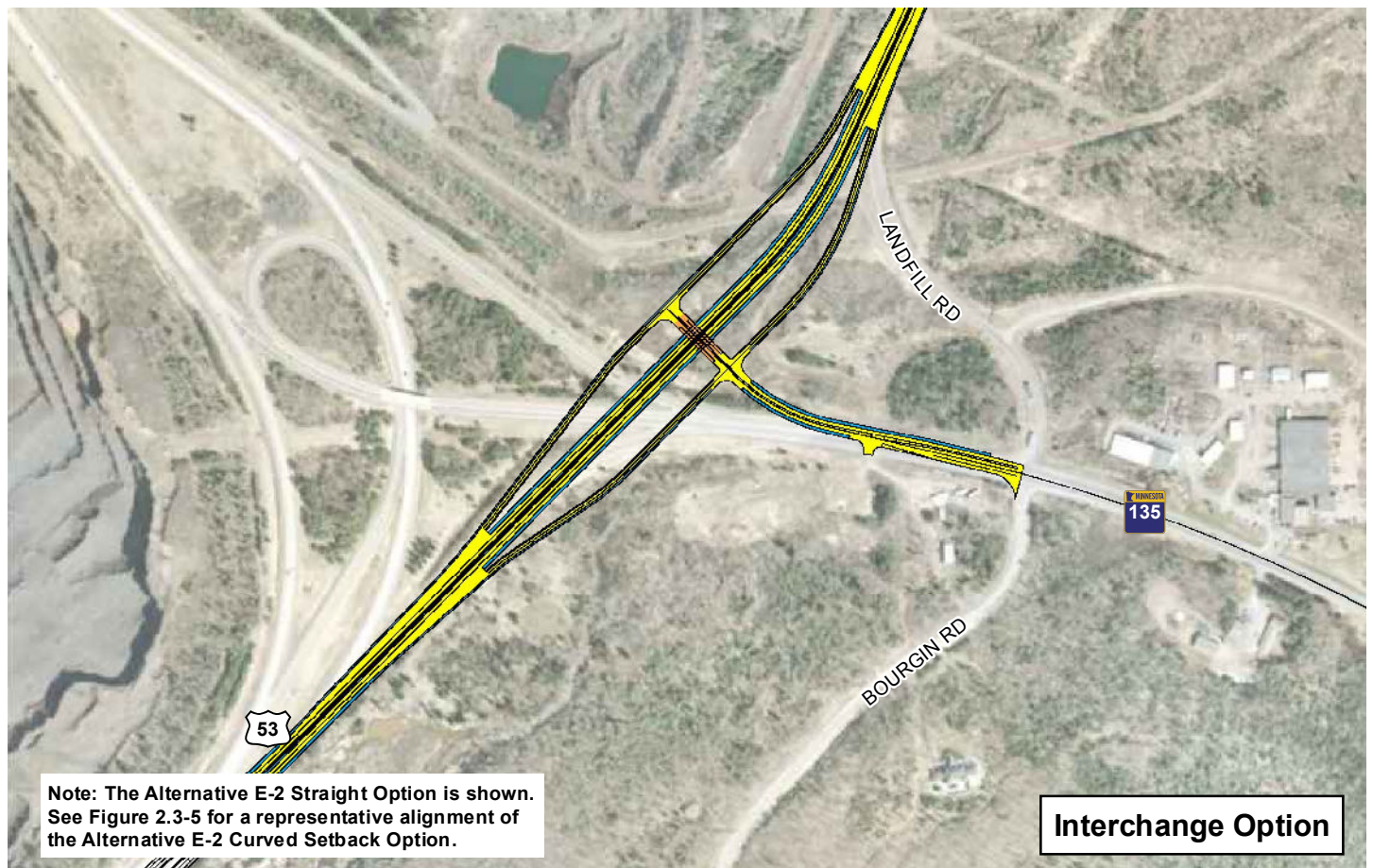
Legend

- Alternative E-2
- xxx Road Removals
- - - Existing Mesabi Trail



0 250 500 Feet

Figure 2.3-6
Alternative E-2
Local Street Connections
US Highway 53 Virginia to Eveleth
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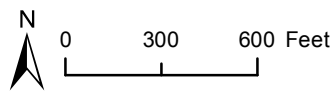


Figure 2.3-7
Alternative E-2 Intersection and Interchange Options
 US Highway 53 Virginia to Eveleth
 Draft Environmental Impact Statement